Education and Culture
Culture 2000
with the support of the Culture 2000 programme of the European Union

RESCUING THE HIDDEN EUROPEAN WOODEN CHURCHES HERITAGE

an International Methodology for Implementing a Database for Restoration Projects

Gennaro Tampone and Michela Semplici *Scientific Editors*

Promoted and Organized
Romualdo Del Bianco Foundation

Scientific Co-organizer
Collegio degli Ingegneri della Toscana

Co-organizer
Faculty of Architecture, Brno University of Technology
Faculty of Architecture, Cracow University of Technology
Faculty of Architecture, Warsaw University of Technology
Faculty of Architecture, Slovak University of Technology

Partner
Kharkov State Technical University of Construction and Architecture

In co-operation with **FLY Events** and **Alter Ego Ing Arch S.r.l.**
(a Subsidiary Company of the ***Collegio degli Ingegneri della Toscana***)

Rescuing the Hidden European Wooden Churches Heritage
An International Methodology for Implementing a Data Base for Restoration Projects

Publisher: In co-operation with **FLY Events** and **Alter Ego Ing Arch S.r.l.** (a Subsidiary Company of the ***Collegio degli Ingegneri della Toscana***)

Scientific Editors: Gennaro Tampone, Michela Semplici

Editing, Graphics and Layout: Michela Semplici

Cover: Lubos Hazucha

Print: Free Books S.r.l. – Città di Castello (PG) Italia, 2006

INDEX

Greetings and auspices

***Francesco Gurrieri**, Professor, University of Florence*
***Joseph King**, Architect, ICCROM, Rome*
***Marco Dezzi Bardeschi**, Professor, ICOMOS Italy*
***Andrzej Tomaszewski**, Professor, University of Warsaw* VII

Paolo del Bianco
Presentation IX

Gennaro Tampone
Foreword XI

The research:
Rescuing the Hidden European Wooden Churches Heritage an International Methodology for Implementing a Database for Restoration Projects XIII

POLAND
Faculty of Architecture, Warsaw University of Technology 1

Stefan Wrona, Krzysztof Koszewski
The Role of Databases in Rescuing Wooden Religious Buildings 3

Robert M. Kunkel
Structural Questions Involving the Oldest Timber Churches of the Carpathian Mountain Region 10

Anna Lorek, Dorota Zaremba, Ewa Jaszczak
The Parish Church of St. Andrew the Apostle in Brwilno Górne, Municipality of Stara Biała, Powiat of Płock: A Historical–Conservation Study, including Guidelines for Necessary Action 19

POLAND
Faculty of Architecture Cracow, University of Technology 65

Andrzej Kadłuczka
Project Report 67

The Church of Miękisz Stary:
- Photographic Documentation
- Drawings 90

CZECH REPUBLIC
Faculty of Architecture Brno, University of Technology 99

Helena Zemánková, Zuzana Jacková, Bohumil Straka, Jan Vaněrek, Petr Hradil, Josef Hrabec, Ivana Žabičková
Report about the Protection and the Conservation Conditions of Wooden Monuments in the Czech Republic 101

The Church of Prašivá: Drawings 116

SLOVAK REPUBLIC
Faculty of Architecture, Brno University of Technology 121

Eva Král'ová, Ivana Lisická
Rescuing the Hidden Slovakian Wooden Church Heritage from the Viewpoint of the Authentic Materials and Technologies 123

Zuzana Babjaková
The Wooden Church of St. George in the Village of Trnove 142

The Church of Trnove: Drawings 152

Zuzana Babjaková
Carpentry Tools 154

Beata Pomolová
Contribution to the Matter of Wooden Church Lighting 162

Jaroslav Španko
Electrical Solution in Wooden Religious Building 165

Ladislav Bobcak
Liturgy of the Eastern Byzantine Rite 170

UKRAINE
Kharkov State Technical University of Construction and Architecture 175

Tetyana Sergeyeva
Socio – Education Impact of National Heritage Research 177

Igor Klimov, Vladimir Lopatko
Peculiarities of Ukrainian Sacred Architecture (Distinctive Features and Traditional Characters) 181

Nikolay Bolotskih, Igor Klimov, Vladimir Lopatko, Tetyana Sergeyeva
Actual Restoration and Preservation Problems of the Ukrainian Wooden Churches 183

ITALY
Collegio degli Ingegneri della Toscana 193

Gennaro Tampone
A Strategy for the Rescuing of the Ancient Wooden Churches of the Central Europe 195

Gennaro Tampone, Antonello Usai, Michela Semplici
Priority of Intervention Among the Wooden Churches Visited 216

Michela Semplici
A Bibliographical Research on the Hidden European Wooden Churches Heritage 217

Michela Semplici
General Database on Wooden Religious Buildings and Churches with Timber Load Bearing Structures 228

OTHER CONTRIBUTIONS 233

José García Vicente
UNESCO-ICOMOS Documentation Centre: an International Bibliographic Resource on Built Heritage 235

Aleksander Niedzielski, Piotr Stachurski
Selected Examples of Upper-Silesian Wooden Churches Rescuing from Destructive Elements 238

Greetings and auspices

HERITAGE

Wooden Church Heritage è il tema specifico di questo incontro a Firenze: una città ove, fin dal 1983, si sono chiamati a convegno per confrontare le loro esperienze, Paesi e Tecnici di molte parti del nostro pianeta.
La risposta, in questi due decenni, è sempre stata generosa e qualificatissima, consentendo quel confronto di principi, di metodi e di tecniche che costituisce il solo modo di progredire scientificamente.
Questa occasione, oltre all'utile confronto, ha ora una valenza in più: quella di aver creato le premesse per sistematizzare e implementare un database dei progetti di restauro delle strutture lignee. Insomma, una "casa comune" ove depositare esperienze e attingere informazioni. Qualcosa che è stato invocato fin dal 1931, quando una prima riunione internazionale dei Tecnici del Restauro produsse la "Carta del Restauro di Atene", postulando lo scambio sistematico delle informazioni in una specie di "archivio comune". Oggi, la tecnologia multimediale consente di realizzare facilmente contenitori virtuali, così che l'impegno alla reciproca circolazione della "progettualità" (intesa nel senso più largo) diventa più realistico.
Così, la comunità scientifica è sempre meno un concetto astratto e sempre più qualcosa che ci fa sentire tutti più vicini. Le prossime generazioni di studiosi troveranno più aggregazione, più strumenti, più rapide capacità di confronto e di metodiche collaudate; e ne disporranno in tempi brevi, in "tempo reale", come ormai si dice con una locuzione consueta. Se così sarà, significherà che queste nostre sperimentazioni, questi incontri, queste premesse, erano ben riposti.

Francesco Gurrieri
Restauratore, Università di Firenze

Remarks on the Occasion of the Seminar on Rescuing the Hidden European Wooden Church Heritage

It is a great pleasure for me to be here today to representing ICCROM, and in particular, my Director General, Mr. Mounir Bouchenaki. I would first like to acknowledge our hosts for this meeting, the Fondazione Romualdo del Bianco and the Collegio degli Ingegneri della Toscana, and also all of the partners that have been working on this very interesting initiative.

The theme of this project, the Rescuing the Hidden European Wooden Church Heritage, brought several ideas to my mind. The first "Wooden Church Heritage" speaks to the materiality of these buildings. Wood is the main material which makes up the form and structure. The conservation of this material is of utmost importance, and although progress has been made over the years in understanding the physical conservation problems of wood, we still have more work to do.

The second word of interest in the title was "hidden". What was meant by that word? Of course, it cannot be taken literally. Church buildings cannot literally be hidden from view. This means that this heritage must be "hidden in plain sight". But, hidden to whom? Maybe they are hidden to those of us in the conservation community who are concerned with more "important monuments"; or maybe to national officials who have other priorities; or to their own local communities. And yet, since most of these churches are still in use, they must still play some role within the living traditions of the communities in which they are found.

The issue of living religious heritage has been of growing interest at ICCROM. In October 2003, ICCROM held a Forum on this topic, and a number of issues were highlighted including:

1. *the need to reconcile conservation with changing liturgical and functional needs;*
2. *the fact that interest in religion will fluctuate over time making religious heritage, sometime more and sometimes less central to the daily lives of people;*
3. *the growing secular pressures on many religious places, particularly from tourism;*
4. *the occasional conflict between continuity of traditions and "scientific" conservation.*

By way of conclusion, the Forum found that living religious heritage, both tangible and intangible, is important in expressing and sustaining the faiths which give spiritual identity, meaning, and purpose to human life. The Forum also concluded that the religious communities for which the heritage has importance but should be primarily responsible for continued maintenance and conservation, in consultation with conservation professionals.

I'm pleased that the work carried out within the project Rescuing the Hidden European Wooden Church Heritage is helping us to understand a part of the living religious heritage of Europe. The project is building our awareness of this important heritage and helping to conserve it for the future.

Joseph King
ICCROM, Unit Director, Sites Unit

Sono molto felice di portarvi i saluti di benvenuto della sezione italiana dell'ICOMOS che ho ora l'onore di presiedere. Mi sono formato, assieme a molti amici e colleghi presenti in questa sala come i professori Guerrieri e Tampone, alla scuola di Piero Sanpaolesi che ha dedicato tutta la sua intensa vita di studioso e di operatore alla conservazione dell'eredità materiale del nostro patrimonio architettonico. Nel primo pomeriggio farò la mia comunicazione "dal restauro alla conservazione" per sottolineare che i tempi sono maturi per il definitivo passaggio, che io penso epocale e spero irreversibile, alla cultura della permanenza.

Come voi ben sapete dopo la prima esposizione internazionale sul restauro dei monumenti tenutasi a Parigi al Palais de Chaillot nel 1957 e la successiva che abbiamo avuto l'occasione di allestire a Venezia a Palazzo Grassi nel '64 in contemporanea con il grande evento del Congresso dal quale è uscita la Carta di Venezia, che rappresenta ancora, con tutti i suoi approfondimenti e declinazioni nazionali, il documento di riferimento che ci unisce a livello mondiale, non abbiamo avuto finora altre occasioni ufficiali per mettere in comune e confrontare le nostre esperienze sul campo. È per questo che abbiamo pensato di organizzare, a distanza di oltre 40 anni da quell'importante incontro, con la collaborazione del nostro Ministero dei Beni e delle Attività Culturali, la terza mostra internazionale del restauro monumentale a Milano nel prossimo mese di febbraio in occasione di una esposizione più vasta che si chiama Build Up Expò.

Per tale occasione abbiamo ristampato l'ormai introvabile catalogo della Mostra del '64 che già segnava un primo significativo punto di distacco dal restauro inteso come ripristino o rifrazione che ancora contrassegnava la prima mostra parigina del '57. Per una disciplina dall'evoluzione spesso ancora non lineare e contraddittoria come la nostra, nata nella terza decade dell'Ottocento come una costola erratica della composizione architettonica (l'esempio di Viollet le Duc lo conferma) la nuova iniziativa di confronto a tutto campo avrà come tema conduttore appunto "dal restauro alla conservazione". A confermarci l'obbiettivo prioritario della cura (e non della manomissione) del costruito esistente ora finalmente interviene anche il nuovo Codice dei Beni Culturali del Paesaggio il quale all'art. 29 per la prima volta definisce correttamente il ventaglio delle operazioni di prevenzione, manutenzione e restauro finalizzate -è scritto- "al mantenimento dell'integrità materiale, dell'efficienza funzionale e dell'identità del bene e delle sue parti".

Noi ci auguriamo di poter rivedere opportunamente sviluppate e approfondite nella Mostra milanese alla quale fin da ora sollecito la vostra attiva partecipazione, le esperienze esposte in questa stessa sala.

Grazie e buon lavoro.

Professor Marco Dezzi Bardeschi
President of the ICOMOS Italian Committee, Politecnico di Milano

L'architettura religiosa lignea in Europa: qualche considerazione introduttiva

Europa centrale-orientale, legata fuori del limes *dell'impero romano, non conosceva fin alla cristianizzazione nel X secolo le tecniche edilizie basate sulla pietra e sul mattone saldate con malta. Invece essa sviluppava dalle epoche preistoriche le tecniche edilizie in legno, ottenendo un livello costruttivo sconosciuto all'occidente. Questa tradizione regionale continuava nel millennio scorso, riguardando anche l'architettura religiosa: cristiana – cattolica e ortodossa, ma anche quella ebraica. Le chiese e le sinagoghe costruite in legno raggiungevano un altissimo livello architettonico e costruttivo, trasformando ed interpretando le forme dell'architettura monumentale: gotica, barocca o bizantina.*

L'architettura religiosa in legno, grazie alla sua ricchezza artistica, costituisce un elemento importante del patrimonio della regione, caratteristico del paesaggio culturale dell'Europa centrale-orientale. I suoi valori sono stati riconosciuti dal Comitato del Patrimonio Mondiale dell'UNESCO: Le sei chiese gotiche in legno nelle montagne Carpazi e le due chiese barocche in Silesia (le "chiese della pace" luterane) in Polonia, ed anche un gruppo delle chiese in Maramures in Romania si trovano nell'elenco del patrimonio culturale dell'umanità.

Purtroppo, il patrimonio di legno è molto piu fragile da quello costruito da pietra e mattone. Il suo nemico mortale è il fuoco. Perciò esso si trova in un pericolo permanente, e il numero delle chiese storiche in legno diminuisce. Non siamo in possibilità di proteggere tutte le chiese contro questo pericolo, causato non raramente dalla stupidità umana!

Coscienti di pericolo, possiamo comunque far la documentazione scientifica delle chiese in legno (il preciso e completo rilievo architettonico con la documentazione fotografica) e conservare la registrazione della loro forma spaziale nella realtà virtuale. Questa "conservazione attraverso la documentazione" è importantissima per salvare il nostro patrimonio in legno nella memoria sociale e nella conoscenza scientifica, necessaria per i futuri studi.

Questa documentazione la facciamo secondo le nostre possibilità nei nostri paesi. Ma adesso siamo entrati in una nuova fase delle nostre attività. Grazie alla iniziativa della Fondazione Romualdo Del Bianco, appoggiata dal Collegio degli Ingegneri dalla Toscana, abbiamo potuto riunire le nostre forze e "unitis viribus*" realizzare un programma internazionale, con la partecipazione dei atenei di cinque paesi.*

Il programma realizzato l'anno scorso è di una grande importanza. Una banca di dati, una pubblicazione, le mostre, seminari per gli esperti e per gli studenti – tutto questo costituisce un contributo di un grande valore scientifico, culturale e sociale per la tutela del patrimonio in legno in Europa centrale.

Non posso partecipare personalmente al convegno conclusivo del importante programma realizzato "summa cum laude*" in un'amichevole collaborazione internazionale.*

Saluto tutti i miei amici riuniti oggi a Firenze e auguro loro un buon lavoro e un buon soggiorno nella più bella città del mondo.

Un abbraccione fraterno
vostro Andrzej Tomaszewski, Varsavia, il 19 Ottobre 2006
Professor Emeritus of the University of Warsaw

Presentation

The Romualdo Del Bianco Foundation is a non-profit Florentine institution promoting initiatives which encourage mutual exchanges of knowledge among young and professionals from different countries with an extensive network of universities, libraries, museums, embassies, consulates, as well as public and private cultural institutions and organizations worldwide (http://www.fondazione-delbianco.org). The Foundation endorses an array of cultural events in order to augment the distribution of research information among participants in any specific field of study.

Being fully conscious that the cultural and architectural heritage possesses itself a high capacity for transmitting the values of interpersonal and intercultural exchange, reciprocal awareness and understanding, the Romualdo Del Bianco Foundation has long been committed to a program aimed at its safeguarding and appreciation.

Thus the Romualdo Del Bianco Foundation intends by means of this program to attract the enthusiasm and consensus and, if possible, the impassioned involvement of all those who see in art and architecture non only universal expression of beauty and cultural identity, but also a powerful instrument with which to stimulate interpersonal and intercultural meetings, reciprocal awareness and understanding, and thus friendship between peoples; not solely an effort aimed at the protection of a patrimony which belongs to all humanity, but an investment for world peace; as the Romualdo Del Bianco Foundation's motto : "a past to know together, a common future to built".

The international project "Rescuing hidden European wooden religious heritage: an international methodology for implementing a database for restoration projects" co-funded by the Directorate General for Education and Culture of the European Commission, in the frame of Culture 2000 Program, just synthesizes the above mentioned principles; in fact, apart form providing solutions for preserving cultural and historical heritage, the model has been targeted to provide both educational and scientific purposes for young researchers, sided by their tutors and experts. Those persons, coming from the Collegio degli Ingegneri della Toscana (Italy), the Faculty of Architecture - Technical University of Brno (Czech Republic), the Faculty of Architecture - Cracow Technical University (Poland), the Faculty of Architecture - Slovak Technical University of Bratislava (Slovakia), the Faculty of Architecture - Warsaw Technical University (Poland) and the Kharkov State Technical University of Architecture and Construcion (Ukraine) have set up a working group of people from the field of architecture, history of architecture, and rehabilitation, in order to ensure both a qualified approach of experienced professors and new visions and spirit of young researchers. One of the aims of this project has been to establish a long-term co-operation between these universities and persons, especially young specialists, to ensure a long-lasting effect of the project. The added value of the project is based on this co-operation of similar teams from different countries which will encourage the future co-operation between different players as well.

Last, but not least, the identified problems and offered solutions will also help relevant conservative and policy-makers to plan right preservation strategies when planning organisation and support for their national cultural and architectural peculiarities.

We would like to conclude with a special thanks to all of those who contributed to this international project, as well as the Directorate-General for Education and Culture of the European Commission who co-funded it.

Paolo Del Bianco
President of the Romualdo Del Bianco Foundation, Florence

Foreword

The fervent reading in the last years of a few books, those written by Oplovnikow (Father and Daughter) on the marvellous domed churches of Russia, of Sisa Bela on the extremely varied patrimony of churches, bell towers, tabernacles, altars of Hungary, the readings on the wooden architecture of Lithuania, the extensive account of David Buxton on the wooden churches of central Europe, the direct acquaintance of the extraordinary Stavkircher in Norway, also known from the books written by many authors and in particular by the architecture historian Norberg Schulz, besides the book and the lithographs by Laszlo Debreczeni on the wooden churches of Transylvania and others were certainly my first, personal approach to the subject, the first hint to propose the study of the timber religious architecture of the central Europe, possibly in an homogeneous region, because of their extraordinary quality and variety.

Other suggestions were put forward when Paolo Del Bianco proposed to start a research, with the homonymous Foundation, on some of the most significant elements which are peculiar of the architectural heritage of Central Europe and, at the same time, threatened with severe damage or risk of total loss.

The wooden built patrimony is very fragile; in spite of the tradition, nowadays the people prefer modern churches where the rites can be followed in a suitable way; on the other hand the ancient wooden churches, generally the expression of the feelings of the rural communities, are regarded with growing interest by citizens, scholars of history of architecture and art, tourism agencies etc.

All these churches are of great interest; the large majority of them shows the signs of the centuries, a few are totally neglected and rotten. Only a very restricted number of them are in good condition, generally as a result of recent restoration (say renovation).

The method followed: definition of the object of the study, choice of the samples, survey of the ideological, architectural and architectural characteristics of the samples, detection on the site of the damage of the materials and failure of the structural system, deduction of the damage typologies, planning the repair, elaboration of a strategy for long period conservation, brought the researchers to interesting results; amongst these, the conviction that some generalization are certainly possible, at least to a certain extent.

The final part of the activity was devoted, in fact, to pull out the common factors from the large mass of the data collected, in order to give general indications for the studied specimens and for other buildings and situations which present similarities of destination, building technique, failure: for instance, for the other thousands of ancient wooden churches surviving in Europe.

It is up to us to make every effort to allow them to survive as long as possible.

The scholars of architectural conservation are in the first line but everybody must contribute to this essential task of sharing and preserving this common patrimony of ideological and material roots and identity.

Gennaro Tampone
Scientific Officer
Responsible of the Project

The research:

Rescuing the Hidden European Wooden Churches Heritage

an International Methodology for Implementing a Database for Restoration Projects

The objectives of the project

The project is aimed to represent a model of intervention through a process of mutual exchange and co-operation, starting from the mutual acquaintance of the different working philosophies in each country-partner, then through the survey on site and the exchange of experiences and co-operations. In details, it has been possible to create a database of the important Central Eastern Europe ancient wooden architectural treasures which risk to be lost in next years due to their poor condition of conservation and - first of all – an instrument easy to update and integrate via web. Then it has been possible to identify a selection of wooden churches bearing witness to the local architecture religious tradition, to be promptly rescued as well as to find relevant solutions for keeping their existence alive. All of this allowed also to bring together young people from different European countries in order to create a network based on a long-term co-operation bringing up necessary solutions for common European heritage, as well as to exchange know-how across Europe in different disciplines, thus improving the dissemination of the experience and good practices.

Project location and duration

It lasted from November 2005 till October 2006; was composed by 6 different phases, developed both in Florence and in the other cities-partners:

- *The "Kick-off meeting" (November 6th - 9th, 2005), in Florence, for a general presentation of the wooden architecture in the Country partners, the definition of the general criteria for the selection of the most representative churches*
- *The "Local Research" (November 2005 - March 2006) for a selection of the most interesting case-studies, according to pre-defined standard*
- *"Intermediate meeting" (March 22nd - 24th, 2006), in Florence, for the presentation of 5 detailed cases studies for each partner with an historical, technical, structural survey of each*
- *The "Preparation of a restoration proposal" (March - September 2006), thanks also to a series of visits to the interested sites ("Check-up meeting", July, 12th -20th, 2006, an itinerant survey of the wooden churches) to define the different suitable restoration methodologies*
- *The "Creation of a database", by the Collegio degli Ingegneri della Toscana (April - September 2006), by gathering all the surveys produced by the Universities partner*
- *The "Final meeting" (October, 19th - 21st, 2006), in Florence with the presentation of the database, the final exhibition of the projects of restoration and the book + cd+ web site containing the main project's results*
- *The "Dissemination", that is the presentation of the results in Florence and the concurrent exhibition and presentation in all the Universities partner*

Project implementation, achievements and co-organisers involvement

The project involved 4 Member States (Czech Republic, Italy, Poland and Slovakia), and one third Country, Ukraine, for its wooden historical heritage. Each team consists of the local university (the co-organiser) which has set up a working group of people from the fields of architecture, history of architecture, architectural conservation.

Two macro-phases have been operated: the first aimed to prepare a database of the most significant ancient wooden architectural structures in each Country-partner; the second, to the practical definition of recovering proposals and the dissemination of results for more appropriate practice.

It was necessary, at first, to jointly define the criteria for the selection of the examples, then for the research and study, then for their scheduling; to do that, all the partners met in Florence at the kick-off meeting, under the scientific co-ordination of the Italian partner. Then each working group worked remotely: a) proposing a preliminary selection of 5 sites worthy of recovering, to be presented later; b) gathering information about historical, technical, structural, etc. aspects of the sites; c) finding solutions for the preservation of one of them, according to its importance and conservation.

The data base was elaborated by the Collegio degli Ingegneri della Toscana.

Practical results

- *Publication of a book "**Rescuing the hidden European wooden church heritage: an international methodology for implementing a database for restoration projects**" + a CD-Rom containing the results and the database*
- ***Database** easy to consult and update*
- ***Exhibition** of the final results in all universities taking part to the project*
- ***Workshop among young students** in the field of conservation and the participation of experts*

Project beneficiaries

The project delivers a theoretical and operational model which can be replicable by any institutional body (Universities, public bodies and others), which experiences part or all the problems identified in it. The solution can be easily replicable, as it is the final result of a Pan- European co-operation in the definition of all working standards. Apart form providing solutions for preserving cultural and historical heritage the model is targeted to provide both educational and scientific purposes. The identified problems and offered solutions will also help relevant conservative and policy-makers to plan right preservation strategies when planning organisation and support for their national cultural and architectural peculiarities.

Partners

Romualdo Del Bianco Foundation – Florence – Lead Partner
Simone Giometti, Lubos Hazucha, Dana Pesova, Martina Vymyslicka

Collegio degli Ingegneri della Toscana – Scientific Co-ordinator
Gennaro Tampone, Scientific Officer Responsible of the Project, Fabio Torricini, Angela Lavanna, Michela Semplici, Antonello Usai

Faculty of Architecture, Technical University of Brno (Czech Republic) - Co-organiser
Helena Zemánková, Ivo Boháč, Zuzana Jacková, Jan Mléčka, Ivana Žabičková, Bohumil Straka, Jan Vaněrek, Joseph Hrabec, Petr Hradil

Faculty of Architecture, Technical University of Cracow (Poland) - Co-organiser
Andrzej Kadłuczka, Jerzy Jasieńko, Kazimierz Kuśnierz, Jakub Bil, Zbigniew Wikłacz

Faculty of Architecture, Slovak Technical University of Bratislava (Slovakia) - Co-organiser
Eva Král'ová, Ivana Lisická, Zuzana Babjaková, Peter Krusinsky

Faculty of Architecture, Technical University of Warsaw (Poland) - Co-organiser
Stefan Wrona, Andrzej Tomaszewski, Robert Kunkel, Krzysztof Koszewski

Kharkov State Technical University of Construction and Architecture - Associated Partner

POLAND

Faculty of Architecture
Warsaw University of Technology

The Role of Databases in Rescuing Wooden Religious Buildings

Stefan Wrona, Krzysztof Koszewski
Department of CAAD, Faculty of Architecture, Warsaw University of Technology

Preserving heritage in the information era

The problem of rescuing historical buildings is one the most important in the process of preservation of our cultural heritage. Rescuing wooden buildings is playing a special role, because of non-solid (impermanent) nature of building materials.
Thanks to the special role and care, mainly wooden religious buildings from the past survive. On the list of potential dangers for old wooden buildings are: funguses, insects and fire. Especially the last one is danger, because it could even demolish all wooden structures, building detail and furnishing in 20 minutes. Therefore existence of full and detailed documentation (inventory) is so important. In the last decades a new digital tool enriched a set of traditional methods of preservation of all kinds of documents and inventory drawings: databases, scanning and 3D printing. By definition, database is a set of organized data and accompanying computer program to maintain and manipulate it. We can find very simple definition of a database in Wikipedia:
"A database is a collection of logically related data designed to meet the information needs of one or more users. A possible definition is that a database is a collection of records stored in a computer in a systematic way, so that a computer program can consult it to answer questions. For better retrieval and sorting, each record is usually organized as a set of data elements (facts). The items retrieved in answer to queries become information that can be used to make decisions. The computer program used to manage and query a database is known as a database management system (DBMS)."
Databases and other above mentioned digital tools bring not only a new ways and qualities of collecting and storing data, but first of all allow for remote access to data and fast multiplying it. The last feature is especially important for rescuing information. The existence of digital precise and detailed information, describing sometimes complex spatial wooden structures or wooden building details, brings a new possibilities in rescuing buildings by saving information of them. Databases also allow for continuous updating information coming from monitoring equipment, like digital life cameras and different kinds of sensors.
Terabytes of information available in the global network of networks paradoxally degrade the idea of information society. The new term emerged as a reaction to this fact: knowledge society. In fact, knowledge can be defined as the ability of using information. The vast amount of data (sometimes not even information, which can be treated as data with some order introduced) actually disables the ability of using it with sense. There is no way of using Internet sources without specialized agents (like Google tools). These agents are created with the objective of transforming information into knowledge. Their task is to process information, and information processing is a key difference between database (source of information) and the knowledge base (source of knowledge). Such information processing has to be based on some rules, which are called knowledge representation. So when we want to create possible scalable, universal (in the sense mentioned before) sources of knowledge, we have to formalize and record knowledge and merge it with information gathered in databases. One of the ways of formalizing and recording knowledge is to express it in the form of rules, which can connect information. In the case of historic-architectural information and knowledge different - contexts of objects (any scale) can be valuable source of knowledge.

The Polish case, Faculty of Architecture, Warsaw University of Technology experience

In the case of several countries having many hundreds historical wooden buildings high risk of fire exists. The example of such country is Poland, where about 3000 wooden religious buildings exist coming from 15 to 20 century, with 1700 churches among them. Six of those churches are on the UNESCO's World Heritage List of Monuments.

In the past ten years 50 similar buildings were destroyed by fire (e.g. churches in Tarnow (16th cent.), Witkow (17th cent.), Roznowice (18th cent.). Only in the year 2005, 222 fires of religious buildings were registered in Poland. The last one took place on September 13, 2006 in Komancza (orthodox church from the year 1802).

1. Orthodox church in Komancza (southern-east Poland, Podkarpackie voivodeship) before the fire on 13th of September 2006. Source: wikipedia.pl

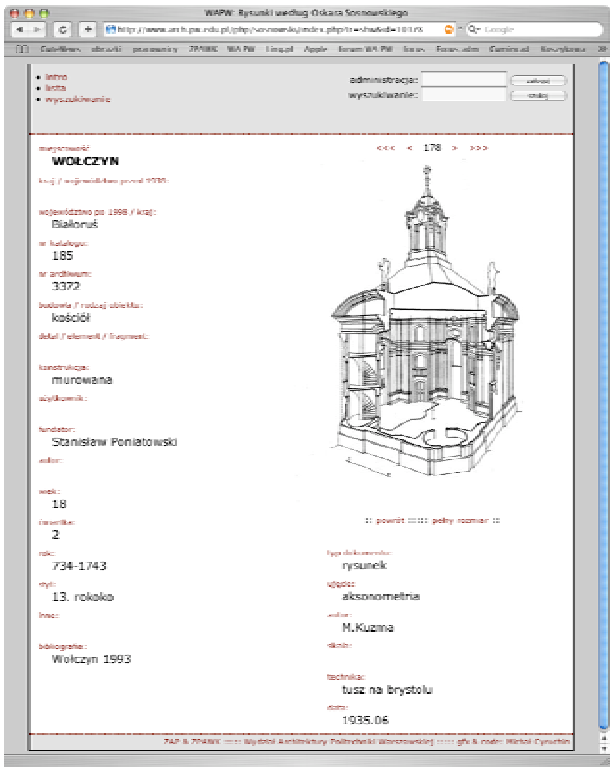
In this situation experts from Poland, in the last years, were interested in developing databases and other digital tools as methods of rescuing information about wooden religious buildings. In our research works we are using former experiences with databases applied to rescuing information and study several kinds of architectural monuments, e.g. database of Prof. Oskar Sosnowski architectural drawings, developed in the Department of Polish Architecture, at the Faculty of Architecture of Warsaw University of Technology. Again, these activities were caused mainly by two objectives: digital form of preservation of precious drawings, often showing buildings already destroyed and the will of dissemination knowledge gathered in them. It is worth to mention that these drawings survived the Second World War disaster only by happily coincidence and the more precious and worth saving they are now.

Recently, the main effort in our research works and experiments is done in development concepts of Knowledge Bases (as a next step in the development of database tools) and remote access to that knowledge. These efforts have strong background in the analysis of recent situation in the field of information technology and information society, as mentioned before.

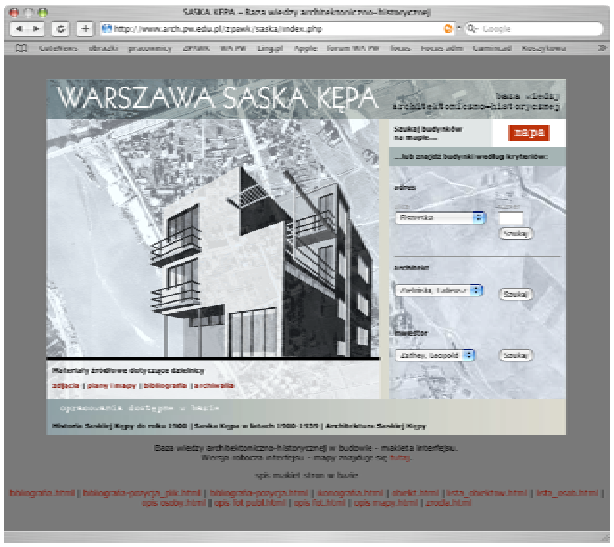
Based on collaboration among architects, historians and computer scientists, in the last year an interesting doctor thesis was prepared in our Department of CAAD. The title of the thesis is: "An idea of architectural-historic knowledge base on the example of Saska Kepa district in Warsaw". Let us describe this work and presented approach briefly.

The main task of the project was to design a model of subject-specific knowledge base concerning architecture of Saska Kepa, a single family housing district of the between-war Warsaw. Some of the most significant examples of modern movement in polish architecture can be found there. The idea of using a knowledge base for this district is justified by the need for documenting its unique architectural heritage. The large part of the original building documentation and iconography is still in private hands and vanishes almost on daily basis. The rest of related documents was lost during the World War II or dispersed through various institutions: archives, museums, libraries. Every attempt to synthesize any aspect of the knowledge concerning the architecture of Saska Kepa forces one to do the whole research almost from the beginning.

This experience can be also useful while dealing with wooden religious heritage. The idea must be always preceded by very careful approach to gathering information, data structure design and possible usage of the base, drawn from previous experiences.



2. The interface of the database of the drawings of Oskar Sosnowski prepared at the Faculty of Architecture, Warsaw University of Technology. The windows shows one record – the drawing and its' description. The base can be found at http://www.arch.pw.edu.pl/php/sosnowski.
The interface language is Polish.



3. The main screen of the architectural-historic knowledge base about Saska Kepa estate in Warsaw (web interface)

The wooden religious heritage project

The aim of the project is to create a database that can be a source of information for restoration projects. This main objective caused creators to focus on preservation data, which can be later used by experts who prepare conservation strategy. But in this case it is also important to disseminate knowledge about wooden architecture. These reasons make recording the state of this part of heritage extremely important and urgent.

The necessity of adopting a description standard

In this way some other, besides the main, database objectives emerged on such basis. The records consist of basic (but possibly most complete) information about the objects (based on Core Data Index to Historic Buildings and of the Architectural Heritage1) and the specialized conservation data. This basic information can be used in relation to other data derived from the building context. In this way it may become a part of a larger structure (like gathered illustration material).
The basic structure of the description standard applied in this project follows Core Data Index, but there are some modifications as the result of the need for more detailed data in some specific areas. The table below shows these differences in detail. Fields not altered (the same in Core Data Index and our description schema) are marked only with their number in both standards, as a kind of mapping between them.

Wooden religious heritage restoration project description schema	**Core Data Index fields**	**Basic differences**	**Reasons for standard alteration**
1.0 Names and References	**1.0 Names and References**		
1.1 – 1.3	1.1 – 1.3	-	-
1.4 Recording Organization	1.4 Recording Organization	More detailed description, subfields 1.4.1 – 1.4.3 introduced	The need of clear identification of the record author, since the project is a international collaboration

[1] The Committee of Ministers of the Council of Europe adopted the standard on 11 January 1995 by "Recommendation on the co-ordination of documentation methods and systems related to historic buildings and monuments of the architectural heritage".

Wooden religious heritage restoration project description schema	**Core Data Index fields**	**Basic differences**	**Reasons for standard alteration**
1.5 – 1.6	1.5 – 1.6	-	-
1.7 Cross Reference to Documentation	1.7 Cross Reference to Documentation	More detailed description of available resources, subfields 1.7.4.1 and 1.7.4.2 added	The need of documenting sources due to scientific character of work
1.8 Cross Reference to Archaeological Records	1.8	-	-
1.9 Cross Reference to Environmental Records	1.9 Cross Reference to Environmental Records	Item specific description related to the main material – timber, climate conditions, available timbers, customs, tools, pathogenic agents 1.9.a Environmental Conditions and	Specific of the work, important environmental factor which has to be recorded
2.0 Location	**2.0 Location, Identification and Use of the Property**		
2.1 – 2.4 (Administrative Location, Address, geographic Reference, Cadastral Reference)	2.1 – 2.4	-	-
2.5 Ownership and juridical Status	-	Added field	Information important for restoration purposes
2.6 Hierarchical Functions 2.7 Religious territorial district 2.8 Cult	-	Added fields	Information strictly connected with buildings character (wooden religious)
2.9 Current use	-	Added field	Information important for restoration purposes
2.10 Building Type	3.1	-	-
2.11 Detailed Architectural Typology	-	Added field	The need of describing important feature of the buildings for restoration process
2.12 Building Category	3.2		

Wooden religious heritage restoration project description schema	**Core Data Index fields**	**Basic differences**	**Reasons for standard alteration**
3.0 Dating	**4.0 Dating**	Respective change of numeration, subfields not altered	
4.0 Persons and Organizations	**5.0 Persons and Organizations**	Respective change of numeration, subfields not altered	
5.0 Building Materials and Techniques	**6.0 Building Materials and Techniques**	Respective change of numeration	
5.1 Main Materials and Structural Techniques	5.1 Main Materials and Structural Techniques	More detailed description, necessary subfields added: 5.1.2 Botanic Species, 5.1.3 Characteristics, 5.1.4 Structural System, 5.1.5 Building Techniques, 5.1.6 Construction Process, 5.1.7 Kind of Connections, 5.1.8 Decoration Elements	The restoration character of project requires detailed description of the building structure
5.2 Covering materials	6.2	-	-
6.0 References to Codes	**-**	Added field	Information important for restoration purposes
7.0 Physical Conditions	**7.0 Physical Condition**	-	-
7.1 General Condition	7.1	-	-
7.2 Deterioration of Structural Complex	-	Detailed description of the building condition added: 7.2.1 Material Deterioration, 7.2.2 Structural Instabilities, 7.2.3 Alterations of Structural Complex, 7.2.4 Strengthening and Restoration, 7. 2.5 Analysis of Risks	The restoration character of project, need for fundamental information from this area.
8.0 Protection	**-**	Change of description structure	-
8.1 Protective Measures	-	Added field	The restoration character of project

Wooden religious heritage restoration project description schema	**Core Data Index fields**	**Basic differences**	**Reasons for standard alteration**
8.2 Protection/Legal Status 8.3 Type of Protection, 8.4 Grade of Protection, 8.5 Date of Protection	8.0, 8.1, 8.2, 8.3 respectively	Respective change of numeration	-
9.0 Notes	**9.0**		
9.1 Historical Summary	9.1	-	-
9.2 Compiler's Note	-	Added field	The need for detailed documentation of the recording process
10.0 Hypothesis	**-**		
10.1 Hypothesis about possible conservation works, 10.2 Possible strengthening and restoration of structural complex, 10.3 Possible future appropriate uses	-	Added fields	Information important for restoration purposes

Table 1. The detailed description of adopting Core Data Index standard to the needs of the database for restoration works on wooden religious buildings. Collaborative work of Faculty of Architecture, Warsaw University of Technology, Poland and Collegio degli Ingegneri della Toscana, Italy.

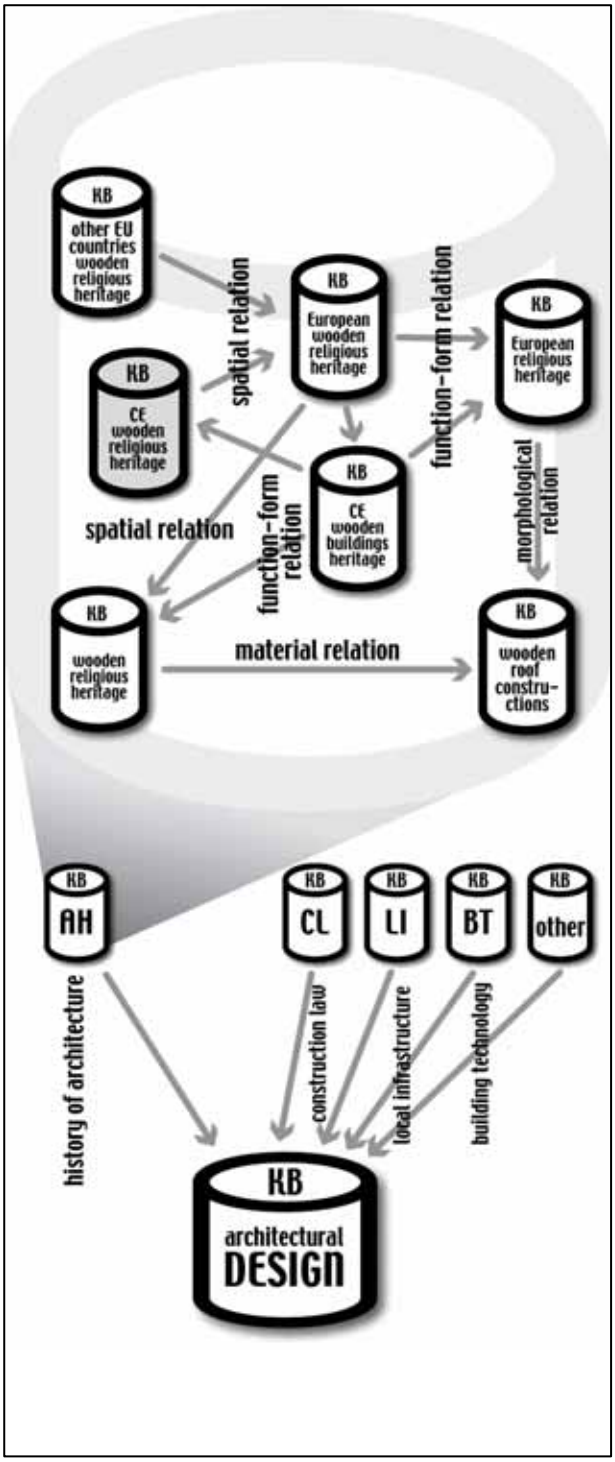
Implementing one of the standards (i.e. Core Data Index) is a crucial task. Each specialized database, concerning a delimited part of reality like this, can be treated as a part of larger system. In this way we can imagine a structure of specialized databases connected together and describing larger part of an area. This approach is caused mainly by our consciousness, that state-of-the-art in this field is far under our expectations. Creating this kind of a large structure (like the database of history of architecture) in one step is, on the other hand, not possible. So the only way is to develop specialized sources of information that are ready to be a part of a larger system. The main condition is to use interoperable standards, which are common among the other databases concerning the same field. This approach is easy noticeable in the case of wooden heritage, which, according to the contemporary approach to history of architecture, is an integral part of architectural heritage as a whole. Following basic guidelines concerning content and structure of gathered information would ensure flexibility, scalability and future interchange of information.

The need of flexibility

„Apart form providing solutions for preserving cultural and historical heritage the model is targeted to provide both educational and scientific purposes" – this statement comes from the project description. It identifies the role of the database as not only conservation source of information, even in a large database structure, but also as a valuable source of data in many different fields, which can be considered both scientific or educational, both practical and theoretical. This is another reason for adopting international standards in the process of creating our database.

Creating database of wooden architectural heritage is complicated and fragile task, which required a big effort from our international team. The process of gathering and organizing gathered data is time-consuming and demanding very skilled staff. While this difficult task was already undertaken, we made efforts to draw our work as much useful, as possible, also in different areas of interest.

The essential task for ensuring coherent data being entered into database is the development of vocabularies (in some cases maybe thesauri). These vocabularies should ensure that the description is precise and the terms are used commonly thought all the involved teams. The further step may be establishing multilingual thesauri for customizing the database for use in participant's countries. This is one of the basic conditions while considering the dissemination of knowledge among participant countries.



4. Possible structure of the knowledge system shown as a network of independent, specialized knowledge bases connected by various relations between them. The base prepared within current project is marked with grey (CE wooden religious heritage), the others are hypothetic knowledge sources. Any of these systems can be a part of a larger one. Source: author's drawing.

The prognosis of possible actions

The experts' knowledge in the area of preservation of monuments of wooden architecture is, at the time being, implemented in the database in declarative form (diagnostic and activity description proposals). The next step in the process could be an attempt to formalize at least a part of this knowledge. In this way possible solutions or actions can be derived on the basis of gathered facts (like church condition, climate, active pathogenic agents, local carpentry tradition, available materials etc.) and rules applied to them. This action is however beyond the scope of the current project, but the created database can serve as a basis for it. These two solutions (multi-use of information and formalization and recording of experts' knowledge) may be treated as further benefits from creating specialized database for conservators' needs.

Summary

- There were several principles taken into consideration in the course of our work on creating database for restoration projects of wooden religious architecture
- Enriching traditional methods of documentation of heritage by using information technology, while retaining the continuity of the efforts.
- Building replicable repositories thus minimising the data loss
- Following rules that ensure flexibility, scalability and easy information exchange
- Concerning information technology as the most suitable tool for disseminating knowledge in the area of interest
- Gathering and storing information in a way that makes it usable in various fields of activity within the area of interest
- Looking towards a knowledge base structure with possibility of gathering and formalizing knowledge throughout the system.

References

- Brykowska M., Rozbicka M., Wrona S. „The Drawings of Oskar Sosnowski" („Rysunki według Oskara Sosnowskiego"), Faculty of Architecture, Warsaw University of Technology, Warsaw 2000 (in Polish).
- Koszewski K., "An idea of architectural-historic knowledge base on the example of Saska Kepa district in Warsaw", PhD Thesis, Faculty of Architecture, Warsaw University of Technology, Warsaw 2000 (in Polish).

Structural Questions Involving the Oldest Timber Churches of the Carpathian Mountain Region

Robert M. Kunkel
Faculty of Architecture, Warsaw University of Technology

In the Middle Ages, Christian churches built of wood seem to have been universal throughout just about the whole of Europe, then covered by dense forests providing the building material. The only exception was the southern part of the continent—the southern part of the Balkan peninsula as well as countries south of the Alps and the Piranesi, although even there the existence of completely timber churches is sporadically mentioned. The oldest datable buildings whose archeological relics were discovered in the Rheinland are from the Carolingian period. It was raised as a palisade structure, where the walls were built of high and thick posts directly driven into the earth as was done in the case of defensive palisades. The oldest timber churches in existence today date from the 12th century. About thirty have survived in Scandinavia where because of the specific structural solution in which the central section is raised on four high pole–masts, they are generally referred to as *stavkirken*. The wall structure continued to be a post frame structure, but the lower section of the wall posts was set in timber sill beams, which protected them against decay.

The two basic structural systems for Late Middle Age timber churches were the frame system—a spandrel beam system (*Fachwerk* in German)—that was primarily characteristic for northern Europe, and log structures, also known as notched beam structures (*Blockbau* in German), that may be universally, though not exclusively, found in the remaining European regions starting with the 8th century. Also known are composite structures that combine both of the above–named systems: post structures in which the nave's and chancel's notched box–like walls are surrounded by a system of posts bearing the roof structure, and grooved post–log structures where short logs were inserted into the vertical guides of the posts. There is a view that the application of notched structures accompanied the use in construction of softwood, which provides longer pieces, while the short pieces procured from hardwoods tend to imply grooved post–log structures.[1]

Written sources, numerous starting with the 15th century, provide copious information on woodworkers who were, as a rule, professional carpenters often specializing in engineering work, associated in municipal guild associations, who erected bridges, earth–timber fortifications, and the timber roofs of major masonry churches. The second half of the 15th century provides information regarding carpentry tools, including compasses and squares. The builder Michał Enkinger, who at the turn of the 15th and 16th century was the city architect of Gdańsk, then a wealthy commercial metropolis, signed documents as "Michael Carpentarius"—carpenter—thus stressing his engineering specialty in contrast to common masons. For this reason it is not possible to describe timber churches ranking them uncritically as vernacular (folk) structures as is done by some researchers, although it is true that many ancillary jobs at the construction site were performed by the parishioners themselves, under the management of a professional builder.

The oldest presently preserved Roman Catholic timber churches in Central Europe date from the 15th century. They were all erected using notched logs, with the exception of towers, which were frame structures. Although notched log structures in this region already had centuries of tradition behind them as this system was universally used in both residential and defensive facilities, the technical level of workmanship in mature and Late Middle Age church buildings raised by professional carpenters is incomparably higher than earlier examples uncovered by archeologists. It is for this reason that the forming of a single timeline for the development of both types of notched structures—Early and Late Middle Ages—would be a very far–reaching simplification. The identifying marker in this case can be the application of a stabilizing sill beam known as the covered tenon, which is a refined element of carpentered notches in corner members that make possible the creation of a durable and stable

[1] Kalinowski W., Krassowski C., Miłobędzki A. J., "Z problematyki budownictwa drewnianego epoki Odrodzenia" [Questions of timber structures during the Enlightenment], Biuletyn Historii Sztuki [History of art bulletin] 15, 1953, No. 3–4, p. 39.

corner without protruding "remnants."[2] Outside of Lesser Poland (Małopolska), there are more numerous examples of such churches—usually erected at the turn of the 15th and 16th century—in southern Greater Poland (Wielkopolska) as well as on Czech lands, albeit technically less perfect, especially Silesian (a part of the Czech Crown as of the 14th century). In Slovakia, only two churches have such a long pedigree amidst the many timber churches—in Hervartov (Herwatów) and Tverdosin (Twardoszyn).

Interest on the part of art historians in the timber architecture of Central Europe can be noted from the middle of the 19th century. Although looked at and evaluated mainly in categories of "picturesqueness" (it was still too early for detailed structural or typological analyses), A. L. Wolfskran in 1858 and Józef Łepkowski in 1866 noticed a unity of spatial layouts and construction techniques on both sides of the Carpathian Mountains.[3] However, it was not until research into this question during the nineteen–twenties was launched against a broader comparative background by Oskar Sosnowski, who headed the Department of Polish Architecture of the Warsaw University of Technology, that topics linked with formal elements, style, and structural engineering were undertaken.[4]

Timber Eastern Orthodox and Greek–Catholic churches are spread throughout vast areas of Eastern Europe in the southern and eastern Carpathian Mountains all the way to the White Sea in the north. The oldest preserved historical monuments of such architecture date from the 16th century and are few in number. In Poland, only the Orthodox church in Ulucz reaches back to ca. 1510. The bulk is from the 17th and 18th centuries. Guidebooks and studies often state the date of the founding of the church, which generally has little in common with the date of the construction of the existing building—usually a successive one on that site. It is for this reason that it is important to approach the pedigrees of Polish, Romanian, Slovak, and Ukrainian Orthodox churches as noted in Middle Age literature with great care, especially as the traditionalism of technology and the occurrence in these monuments of detail bearing Late Gothic qualities up to the end of the 18th century greatly impedes formal analysis. Moreover, dendro–chronological studies also rarely provide definitive dates of construction due to frequent replacement of individual members during multiple renovation work as well as the reuse of beams from older buildings.

Relatively numerous timber Protestant churches preserved in Central Europe often have noteworthy, well–appointed interiors, but are rarely older than the 17th century. Interesting structural engineering examples may be found in the case of Lutheran churches in Lower Silesian and in Slovak towns. These were raised during the Counter Reformation pursuant to special Imperial privilege, rarely and reluctantly granted, and are known as churches of Grace, Peace, or Articulate churches.

It should be stressed that also in masonry buildings in which walls and vaulting was of stone or brick, the roof structure (and in the case of churches without vaulting, the ceilings as well) was built of wood. Bell towers adjacent to masonry churches were also of wood, as masonry structures were less resistant to vibration caused by the ringing of bells. Often, the erection of a masonry church was started with the raising of timber frames of solid beams that were subsequently encased and remained within the masonry walls serving as something akin to reinforcement up to the time of the final setting of the mortar, which significantly accelerated the construction process.

Construction Material

As demonstrated in studies of Polish Middle Age churches, primarily softwood—pine, spruce, fir, and more rarely larch—was used in construction work. Species readily available on location were used. Oak was used in the case of major structural members such as ground sills and binding joists. The use of poplar and beech is noted very exceptionally. There are cases in which tie beams of truly monstrous dimensions (0.25 m x 0.60 m x 23.0 m) were used. All structural members were hewn and worked using adzes and chisels. Sawn lumber was used for the boarding of floors and ceilings and only rarely in roof structures.[5] Iron nails used to nail boarding and ceilings are already seen in Middle Age historical monuments, iron bolts and hardware tying structural members make their appearance relatively late—the 18th century—and even then their character is one of secondary reinforcement (fret–saws applied to notches) and repair work.[6]

Wall Structure

As was already mentioned, only notched members were used in raising the walls of naves and chancels in the Carpathian Mountain region as discussed, joining corners by "saddle notching," "double notching," or the more refined "dovetailing." Regardless of the type of joining used, a rigid covered tenon was involved. In the oldest buildings, the wall logs grow smaller as they go higher, thanks to which the walls tilt inwards, thus improving the

[2] Brykowski R., *Drewniana architektura kościelna w Małopolsce XV wieku* [Fifteenth Century Timber Church Architecture in Lesser Poland], Wrocław, 1981, pp. 51–52.
[3] Wolfskran A. L., "Ueber einige Holzkirchen in Maehren, Schlesien und Galizien," *Mittheilungen der Kaiserlich–Koeniglichen Central–Commission zur Erforschung und Erhaltung der Baudenkmaele* 3, 1858, No. 4, pp. 85–95; Łemkowski J., "O budowlach drewnianych [On timber structures], *Tygodnik Ilustrowany* [Illustrated Weekly] 13, 1866, No. 540, pp. 144–145.
[4] Sosnowski, O., "Uwagi o gotyckim budownictwie drewnianym w Polsce" [Comments on Gothic timber building construction in Poland], *Biuletyn Historii Sztuki i Kultury* [Bulletin of the history of art and culture] 3, 1935, pp. 171–180; Krassowski W., *Architecktura drewniana w Polsce* [Timber architecture in Poland], Warsaw, 1961.
[5] Brykowski, R., op. cit., pp. 83–84.
[6] Krassowski W., "Studia nad detalami zabytkowych konstrukcji ciesielskich" [Studies on timber structure details in historical building], *Kwartalnik Architektury i Urbanistyki* [Architecture and urban planning quarterly], Vol. 7 (1962), pp. 3–25.

stability of the structure. In order to achieve such a tilt as well as for the walls to grow thinner as they go higher, the logs forming the horizontal beams do not have an ideally rectangular cross section, but form a minimal trapezoid or rhombus. Individual logs are joined to each other using pegs with surfaces scribed to make a tight fit, thus creating a plane surface both inside and out that was originally decorated with paintings. The sill beam was laid on a stone or brick foundation.

The wood was probably not hewn until it reached the construction site. The preparing of the logs for the walls involved the cutting of the original logs into appropriate lengths as well as hewing them in order to achieve the desired cross section. Scribing the logs and forming the joints occurred just prior to assembly. Wall assembly was immediately final, including the incorporation of portal and window framing. The building of the roof was different. The rafter trusses were prepared in a horizontal position on the ground and subsequently disassembled into their individual members in order to be reassembled high up using wood dowels. In order to evade errors in the assembly of the many recurring members, they were marked with successive assembly numbers using a chisel. Points of laying of tie beams on the wall logs were carefully measured and marked by a blood red marker, which is still sometimes visible today.

In terms of wall building technology, two clear groups may be differentiated. R. Brykowski conventionally defined these as "Silesian" and "Lesser Polish." However, comparison with the historical monuments of Slovakia and Bohemia show that this differentiation may be extended to include other lands and primarily refers to a division into buildings erected by professional, municipal builder–carpenters and those that were created with the hands of local, rural craftsmen. The "Silesian" churches usually have beams that are not scribed and as carefully matched as the contemporaneous historical monuments from Lesser Poland and Slovakia. They are often made of semi–rounded beams and are technically primitive, leaving behind remnants, which no professional carpenter would allow. However, they are similar in kind to the method of making walls in most timber Orthodox churches of the Carpathian Mountain region, but primarily the walls of residential and ancillary buildings.

Roof Structures

Rafter–collar beam roof structures of various kind were used in the Carpathian Mountain region on both timber and masonry buildings. They consisted of triangular trusses stiffened longitudinally using wind braces (St. Andrew's crosses) in order to prevent the roof from folding. A new structural solutions for roof structures appeared in the second half of the 15th century is the king post roof system with varied types of trusses, both solid (with king posts, all collar beams, angle braces, and struts) and empty, which do not require such significant quantities of material. In such structures, the tie beams forming the lowest–most member of the rafter truss do not support binding beams at any point; on the contrary, they hang thanks to struts and angle braces, which prevents their bending under their own weight. Thanks to its structural benefits, such a roof structure was used in Central Europe as a traditional solution up to the 17th century, and exceptionally even up to the end of the 18th century.

By allowing simplifying, it may be assumed that the plan of a rural church using a notched structural system consisted of two squares—a larger one (the nave) and a smaller one (the chancel). Adjacent to the north of the chancel was the sacristy, which was lower and covered by a separate shed roof and the western tower, which had its own separate structure not connected with the notched system. The square plans were the result of the uniform lengths of notched structural logs that were available. It is for this reason that two square box–like frames linked by a large rood opening—which significantly weakened the structure—were integrated by a single roof spanning them both. Thus, three possible solutions for roof trusses were possible: two separate roofs of differing spans appropriate for the walls of the nave and chancel, a uniform roof whose span was that of the nave walls, and a uniform roof whose span was that of the chancel walls, Each of these solutions has certain benefits that simultaneously create unique structural problems.

The first method—two separate roofs—is relatively the simplest to build. However, it has two serious flaws: The roof, which is divided into two parts, does not serve as an integrating member for the logs of the nave and chancel, and the relative shortness of the braces stiffening the trusses in the longitudinal plane make it very prone to "folding" due to winds blowing along the church axis.

The second method—a uniform roof of the width of the nave—does not have these defects, but it requires a greater amount of material as well as the building of special cantilevered members along the walls of the chancel in order to support the rafters of the roof, which is too wide at this point and forms huge eaves.

The third, most economical method—a uniform roof of the width of the chancel—is structurally the most complex, however. Because its width in the nave section is too small for it to rest on the logs of the side walls, it must be supported by major sommers called "boxing."

In this last case, structural slight–of–hand is performed twice. Firstly, the logs of the upper section of the chancel walls are extended across the nave to rest on the western wall of the church. Secondly, the side walls of the nave are lowered in order to achieve a slope making possible the covering of the gap created between the roof and walls by extending the planes of the main roof or by using separate shed roofs. In order to prevent bending in the sommers, some churches introduced posts supporting those boxing beams, which results in interiors similar to three–aisle solutions.

What is achieved thanks to this system is a truly compact and uniform truss–based structural system that welds together into a uniform organism wall logs that, in practice, are independent, with a roof covering that makes them immune to wind pressure. In fact, a case is known in which during a flood a church so built was washed away

and floated down the river, settling without any damage in a village downstream. There, the inhabitants saw this as a special gift from the heavens and refused to return the structure to its previous owners.

The roof frame with boxing was fully formed and universally applied in Lesser Poland as early as in the mid–15th century, where over the next century it made its appearance in Mazovia (Boguszyce) and in Cieszyn (Tesin) Silesia—a part of Bohemia (Hrabova).

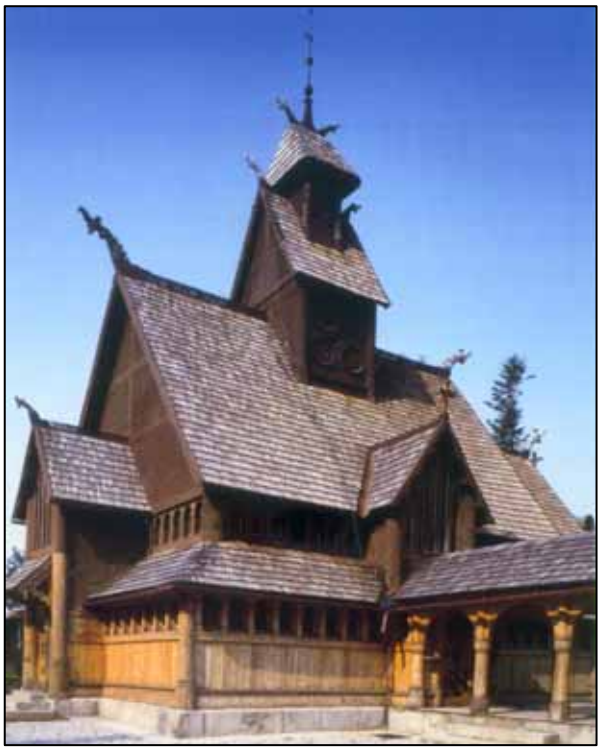
The three main types of roof framing characterized above approximately correspond, in the case of Poland, to three regions—Silesia (Upper), Greater Poland, and Lesser Poland. This was proven by Ryszard Brykowski. A characteristic feature is that the desire to differentiate the size of the nave and chancel did not allow for applying a plan that would seem completely obvious—one in which both church sections would have an equal span. This would make possible the evading of structural problems. However, the traditional differentiation of the interior into the *chorus maior* and *chorus minor* seems to have been of such significance that timber churches with a chancel equal in width to the nave are the absolute exception. This quality appears with such clarity only in the case of timber architecture because in the case of masonry building construction, single–nave rural churches with a chancel the width of the nave, or even single space solutions with the eastern—priestly—section separated by only a symbolic step in the flooring or a rood beam, are solutions found rather frequently.

The interiors of these churches were usually covered by a ceiling of boards fixed directly to the joists serving as the base of the rafter truss roofs. There are also cases of ceilings laid on the joists that were then visible in the interior and received a decorative beveling of their edges. However, for reasons of climate there are no solutions with open roof work. The rule linked with the Platonic symbolism of the circle and square, observed (particularly in Silesia) even in masonry rural churches, insisted that the chancel be spanned by arched vaulting (barrel or groin), while the nave was covered by a flat ceiling. In humbler solutions, the vaulting was a false vaulting of timber. Exceptionally, timber churches also received false timber vaulting for the chancel or at least a facette at the intersection of the wall and ceiling planes. Today only two such examples of vaulting have survived from the Middle Age period—Hervartov in Slovakia and Zborówek in Lesser Poland.

Western Towers

The oldest precisely dated towers of post and beam frame structure with an overhanging ice–apron so very typical of churches in southern Poland are, as a rule, later than the church itself. Free–standing western church towers have survived from the beginnings of the 16th century, while towers whose mass is coupled with the church are only known as of the beginnings of the 17th century. Obviously this does not preclude the existence of earlier ones that did not survive or that are a part of structures that have not as of yet been identified as such, especially as the bells found in present towers usually date from the 15th century, which means that they must have hung in bell towers older than the present ones at some time.

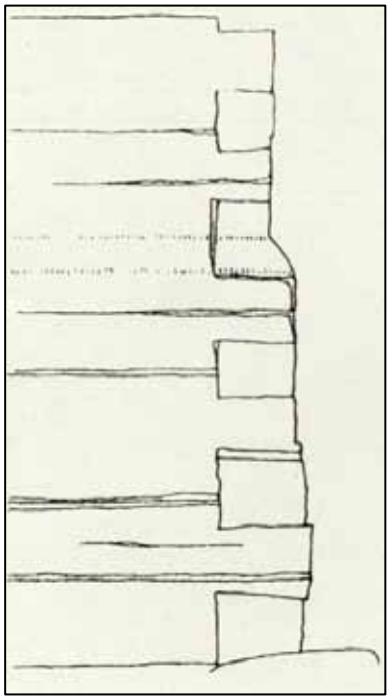
1. Borgund (Nor) stavkyrke



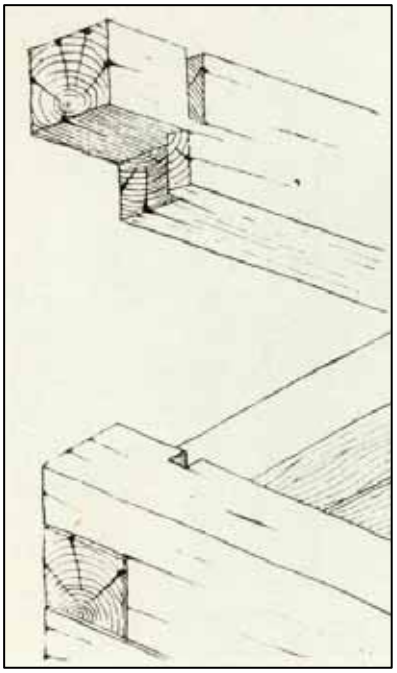
2. Karpacz (Pol) stavkyrke Vang

3. Guty, (MO); framed construction of the walls with „remainders" – local builder's work

4. Framed construction of the walls; 15/16 century;executed by professional carpenters - the joints with „buried tenon" stiffening the joint

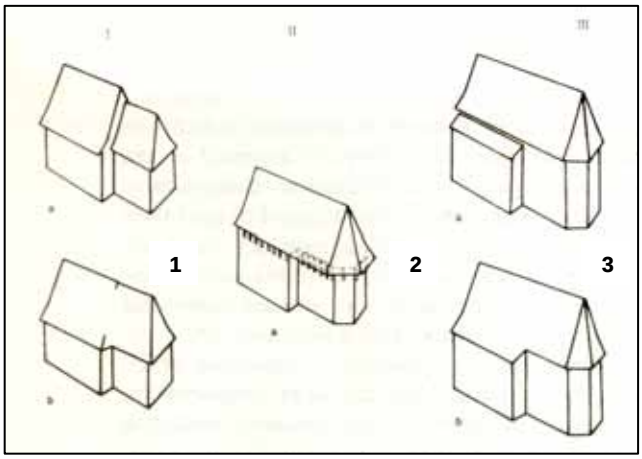


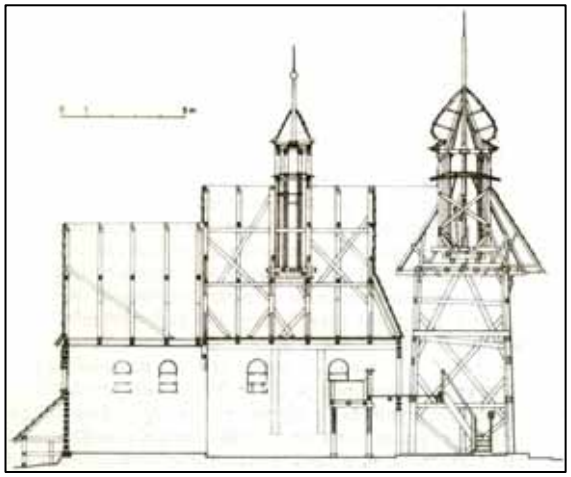
1 - Dębno (PL), after Krassowski
2 - Tvrdosin (SLO), corner, mid 15th century;
3- joint construction (Grebien, PL)



5. Schematic drawings of blocks of Gothic and late Gothic churches depend on roof construction (after Ryszard Brykowski)

1 – „Silesian" group: separate roofs without or with a joint moulded hipped roof
2 – „Wielun" group: homogenous roof construction with nave span
3 – „Podhale" group: homogenous roof construction with chancel span



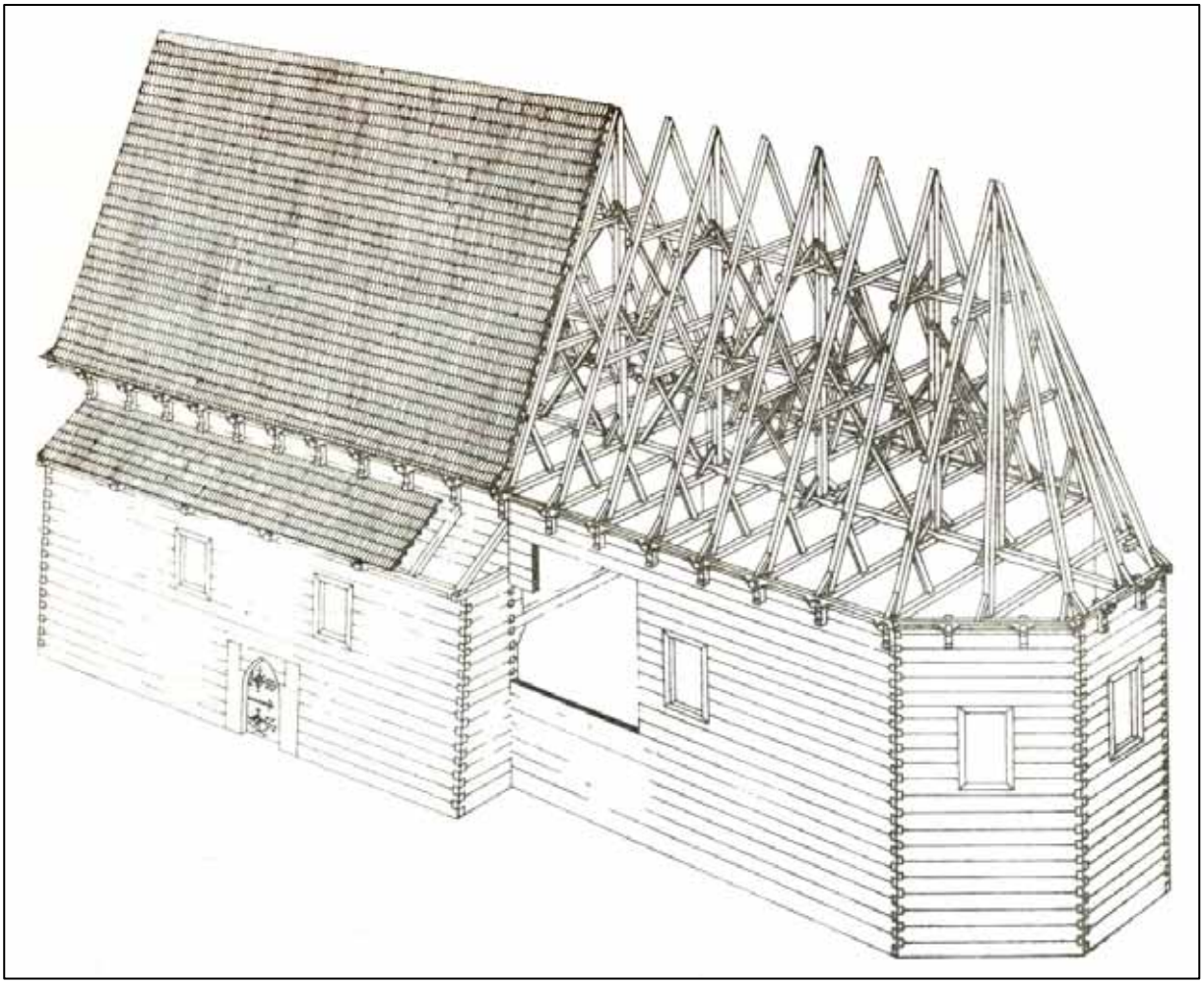


6. Churches with two independent roofs of nave and chancel;

Left: Guty (Mor) and Trnove (Slo)

Pniów (Pol) – built 1506 – longitudinal section

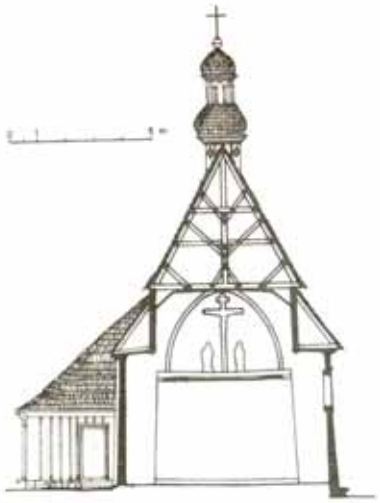
7. Łaszew (PL), church with homogeneous and continuous roof of nave span



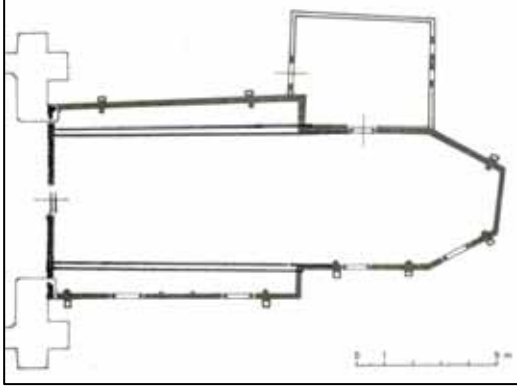
8. Church with the roof of homogeneous construction, the main roof of chancel width, extended above the box

Haczow (PL) end of 14th century

9. Warsaw, TechnUni, Architecture;
model of the church in Haczow;
made by students of architecture ca 1930, destroyed 1944



Zborowek (PL)



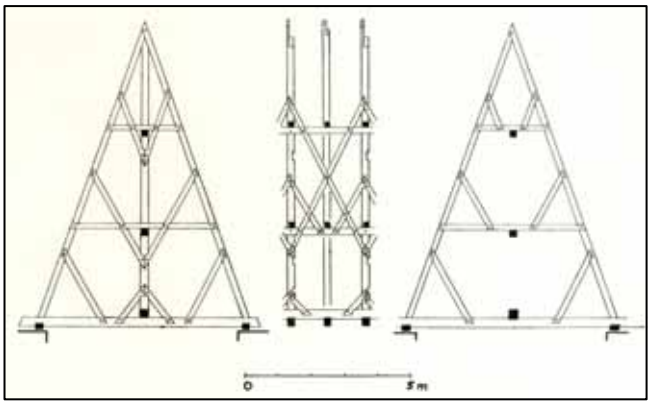
10. Churches with roof resting on „box" over the nave

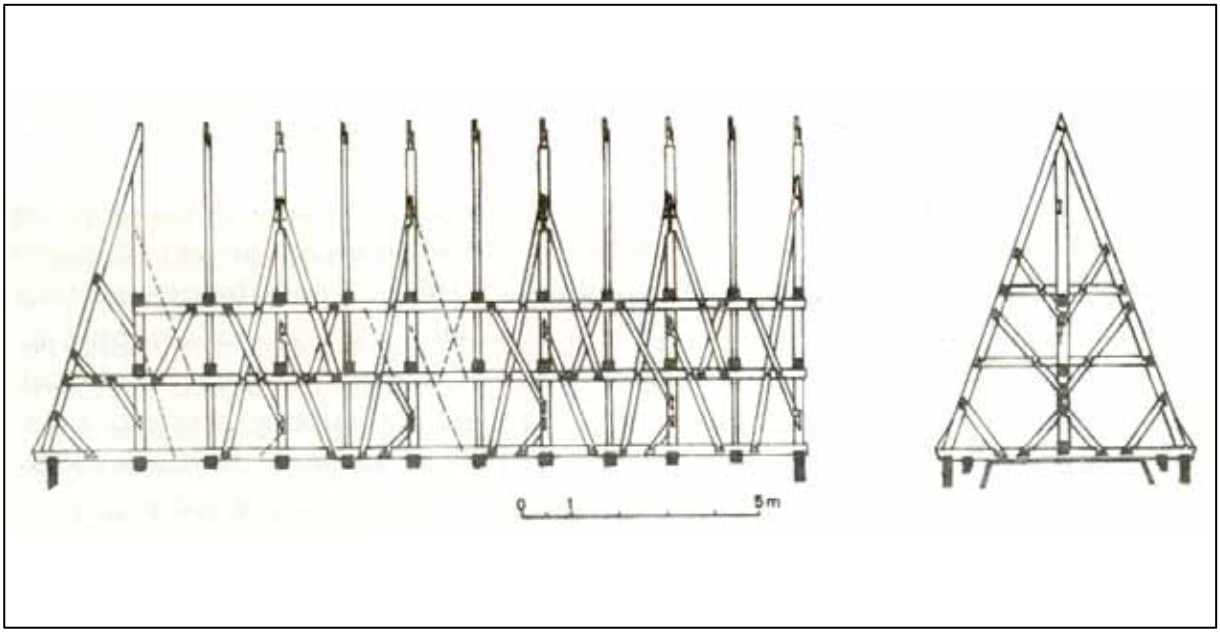
Debno (PL)

Siemiechow 16-th cent

11a. The „king post" truss frames and their longitudinal stiffening

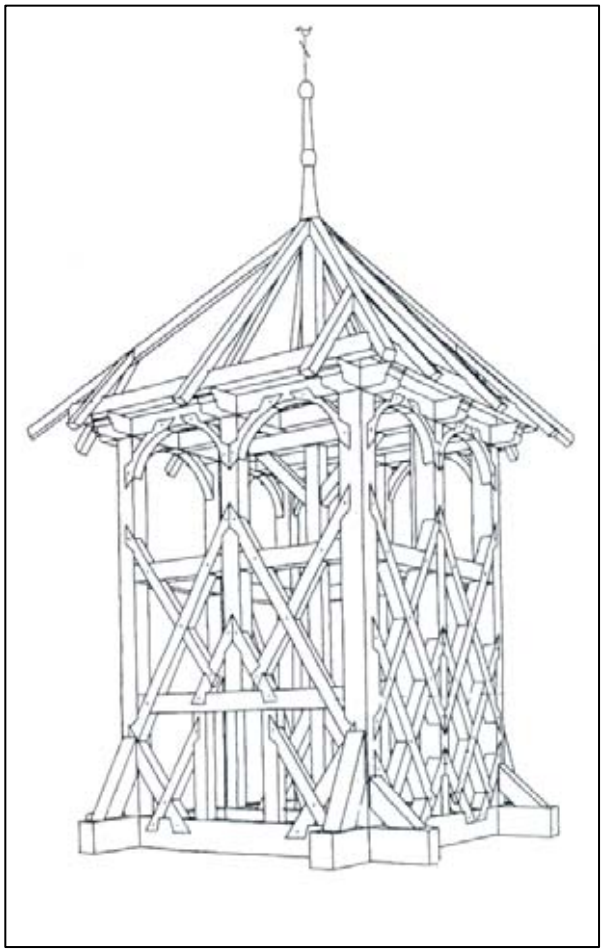
Szydlow (Pol) wooden roof rafters
on medieval stone church





11b. The „king post" truss frames and their longitudinal stiffening
Zborowek (Pol), 1459

12. Freestanding belfry construction



The Parish Church of St. Andrew the Apostle in Brwilno Górne, Municipality of Stara Biała, Powiat of Płock: A Historical–Conservation Study, including Guidelines for Necessary Action

Anna Lorek, Dorota Zaremba, Ewa Jaszczak
Faculty of Architecture, Warsaw University of Technology

1. Characteristics and Description of the Church of St. Andrew the Apostle in Brwilno Górne and Its Surroundings

1.1.The Brwilno Parish Church Complex and Its Role in the Cultural Landscape of the Area

The St. Andrew's Church parish complex in Brwilno Górne is situated "on a picturesque hill overlooking the bank of the Vistula River," near a nameless stream joining the Vistula River a few meters farther on. The church complex of Brwilno is made up of a church, bell tower, the Poznański tomb, and a church cemetery, easily identifiable by massive lime trees. An avenue lined with old apple trees leads to the complex from the Płock–Dobrzyn road. That avenue is a remnant of a road shaded by fruit trees that was so very typical of the end of the 19th century—a custom that is almost unheard of today. The complex has had this exceptional location as of the moment of the establishing of the parish and the founding of the church in the 12th century. Over the centuries, it was subject to transformation, destruction, and rebuilding as well as the adding of new elements, though it continuously served the faithful from this same area. The unique site enriches the visual appeal of the historic complex, but at the same time it is a threat to the existing historical buildings on their original sites. The edge of a landslide that occurred in the spring of 2002 is just seven meters from the eastern wall of the church.

1. Church of St. Andrew the Apostle. View of the church from the road.

The historical buildings-a Baroque timber church, a bell tower from a century later, and a neo-Classical tomb, all surrounded by two–hundred year old lime trees-form a complex of exceptional historical and artistic value, jointly creating the rural cultural landscape.

1.2. Architectural Form with a Description of the Building Structure: A Conservation Analysis

The parish church of St. Andrew's is the oldest and most valuable historical monument of the complex (together with its immediate environs, it is entered into the Register of Historical Monument under heading no. 132/542/62W, by virtue of the decision of March 30, 1962). It is located in the central part of a fenced former church cemetery, where in addition to a bell tower located in the northwestern corner, there is the neo–Classical tomb of a Major of the Polish Army in the southeastern part of the church grounds.

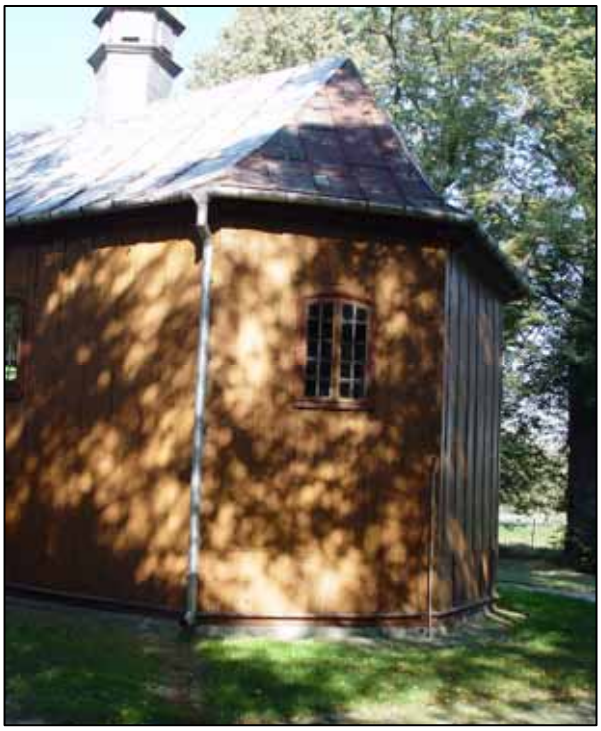
The church in Brwilno Górne belongs to the group of small timber churches of additive volumes, with a dominant rectangular nave terminated by a three–sided end in the east and covered by a rather steep eight–slope roof with three–pitch roofs from the east and the west, crowned by a slender spire. Significantly lower sections adjoin the nave: the main porch from the west, the side porch from the south, and the sacristy from the north. The church is orientated traditionally.

2. Church of St. Andrew the Apostle.
View of the church from the road from the west.

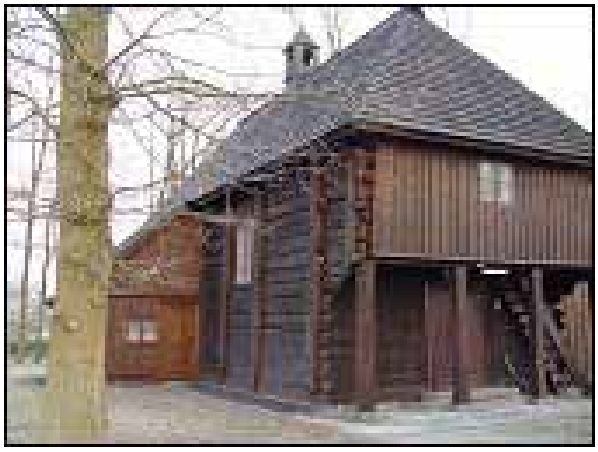
3. Church of St. Andrew the Apostle. View of the church from the south.

4. Church of St. Andrew the Apostle. View of the church from the northeast. The three–sided termination of the chancel and the sacristy are visible.

5. Church of St. Andrew the Apostle. View of the eastern facade.



The form of the church's roof, whose edges in the front part of the church, pushed out in front of the frontal facade and overhanging it, replicate the three–sided outline of the chancel section giving the impression of a postless "arcade" below which is the porch, added a century later than the building of the church. Most probably, the original western part of the church had arcades supported on post, but had no western porch. The first porch was probably added about 1825. The solution may be compared with the form applied in the Church of the Beheading of St. John in Budzynek, Łódź Voivodeship, where the nave, added in the 18th century, has a gable arcade from the west that, in its case, is supported on four posts (Włodzimierz Witkowski, Wybrane problemy z zakresu badań i konserwacji drewnianej architektury sakralnej Archidiecezji Łódzkiej [Selected problems in the study and conservation of timber churches in the Archdiocese of Łódź], Łódź, 2005, p. 9).



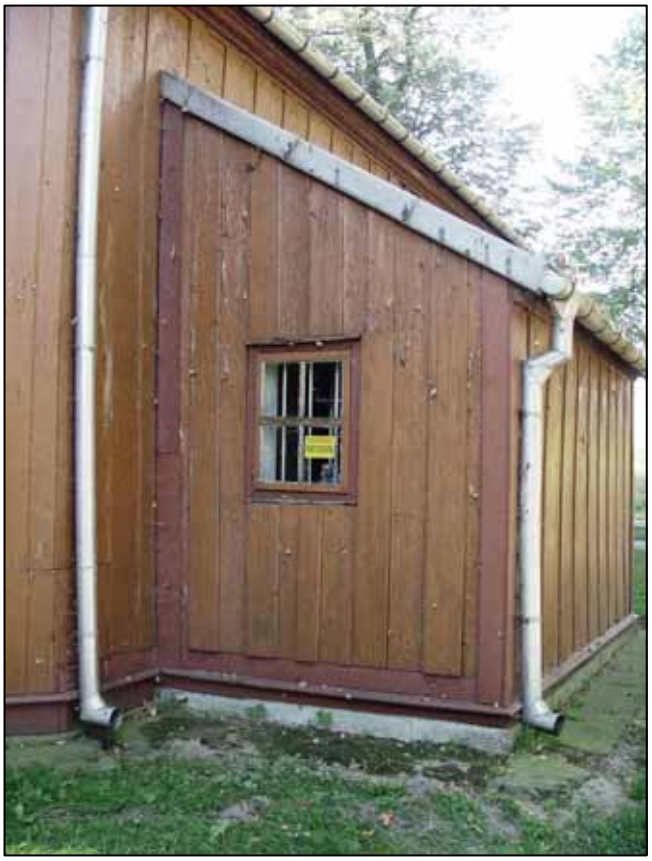
6. Budzynek, Voivodeship of Łódź, Church of the Beheading of St. John the Baptist. View of the 18th century nave with a western gable arcade supported on four posts. The photograph is from Włodzimierz Witkowski, *Wybrane problemy z zakresu badań i konserwacji drewnianej architektury sakralnej Archidiecezji Łódzkiej* [Selected problems in the study and conservation of timber churches in the Archdiocese of Łódź], Łódź, 2005, p. 9.

Other examples of church architecture in Mazowsze [Mazovia] that may be held up as an analogy are small chapels with arcades on posts over the main entrance: the chapel in Pszonów (Skierniewice *Powiat*) from the 18th century, and the chapel of St. Leonard in Króle Duże (Ostrów *Powiat*) from the beginning of the 19th century (Szałygin, Wiśniewski, "Materiały do katalogu drewnianego budownictwa sakralnego na Mazowszu" [Materials for a catalogue of timber church architecture in Mazovia], *Mazowsze 1994* [Mazovia 1994], No. 3(4), pp. 3–104).
Another possible solution presented in the Brwilno church in the earliest phase of its existence might be linked with an eight–sided foundation, similar to the closing of the chancel and western sides of the church. Octagonal churches covered by eight–slope roof raised in the 18th century; one still exists in Grzebsk (Mława *Powiat*)—the Church of St. Leonard.
Another may be found in Kucice (Płońsk *Powiat*)—the Church of St. Michael the Archangel.

7. Grzebsk, Mława *Powiat*. Church of St. Leonard built on an octagonal plan.
The source of the photograph is www.diecezjaplock.pl.
8. Kucice, Płońsk *Powiat*. Church of St. Leonard built on an octagonal plan.
The source of the photograph is www.diecezjaplock.pl.

The question of the closing walls from the west in Brwilno has not been settled at this phase of research. Clarification is still required, which shall be possible upon the unearthing of the foundations on the western side as well as the uncovering of the boarding of the plate of the overhang.
The church is built on the plan of a rectangle where the ratio of the sides is 1:2; it is terminated from the east by a three–sided wall.

The main porch, square in plan, borders with the western side along almost the entire length of the front facade of the nave. On the south, almost in the middle of the length of the nave, is the side entrance porch. It is also square in plan, but half as large as the main porch.
The sacristy is a long rectangle in plan. It is located in a typical manner for churches of this region and the period. It is built along the northern facade in the eastern part of the church. It occupies almost half of the length of the nave.
The church has two entrances—the main entrance from the west and the side entrance from the south.



9. Brwilno Górne. View of the southern facade and the side porch of the church.
10. Brwilno Górne. Church of St. Andrew the Apostle. View of the church from the southwest. The two porches can be seen.
11. Brwilno Górne. Church of St. Andrew the Apostle. View of the eastern facade of the sacristy.

1.2.1. Description of the Church Exterior
Foundations and Wall Structure.

The church is raised on a stone foundation and sill wall of undressed stone built using cement–lime mortar. The walls are of notch larch log construction worked to form squared edges, joined in the corners with dovetail joints, probably with dowels (such information is found in archival materials and can be confirmed by inspection of the southwestern corner) from the nave interior.
The logs rest on oak sole plates joined at the corners by saddle notch joints where wooden dowels are visible.
The sole plate has survived only in fragments. It was partially replaced by concrete inserts in the nineteen–fifties.
All facades of the nave are crowned by a cornice of solid logs with a cusp section on a bead.
The walls of the western porch have no tenons, nor are they coupled with the walls of the nave in any other way, which is confirmed by the fact that the porches were built later than the nave (archival materials state that it was "attached on the west" in 1825 and subsequently rebuilt together with the side porch in 1898). The wall structural system of the porch is different. Sources state and this has been confirmed through uncovering, where the wall are made of "double boards on a framework of timbers." There is also a simplified form of cornice crowning the porches; this also confirms the premise that they were built later. The nave facades were clad on a secondary basis (the boarding was applied in 1898), where the boards are not uniform—repairs are visible as are entire supplemented sections—especially in the lower part of the northern and eastern facades, which were replaced in 1963 and later.

The cladding of the nave, porches, and sacristy consists of vertical pine boards that are lapped with molded surface edges (quarter–bead molding in an offset) and is clearly secondary with respect to the cornice.

Wider and thicker board with deeper quirks underscore the church corners.

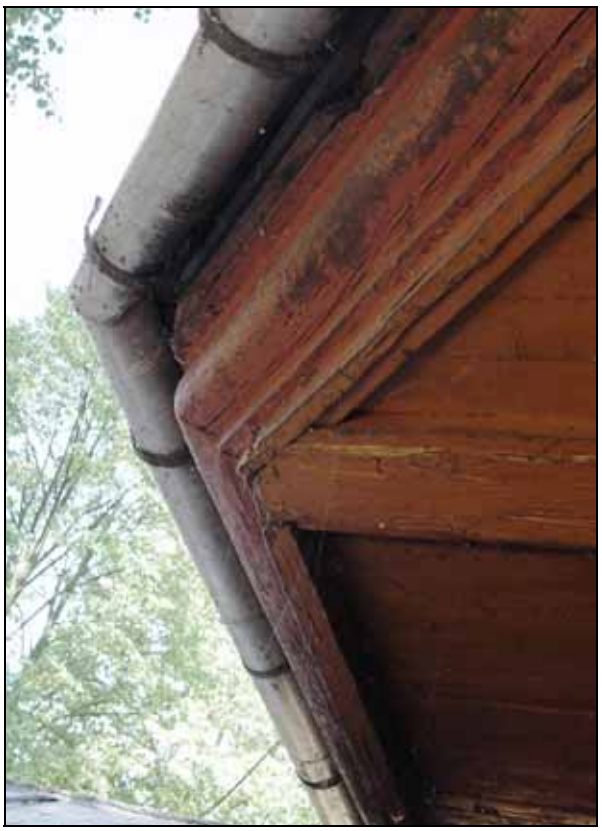
The vertical boards of the cladding are chamfered on the bottom so as to overlap a drip strip that protects the boards covering the sole plates and the sole plates themselves against precipitation.

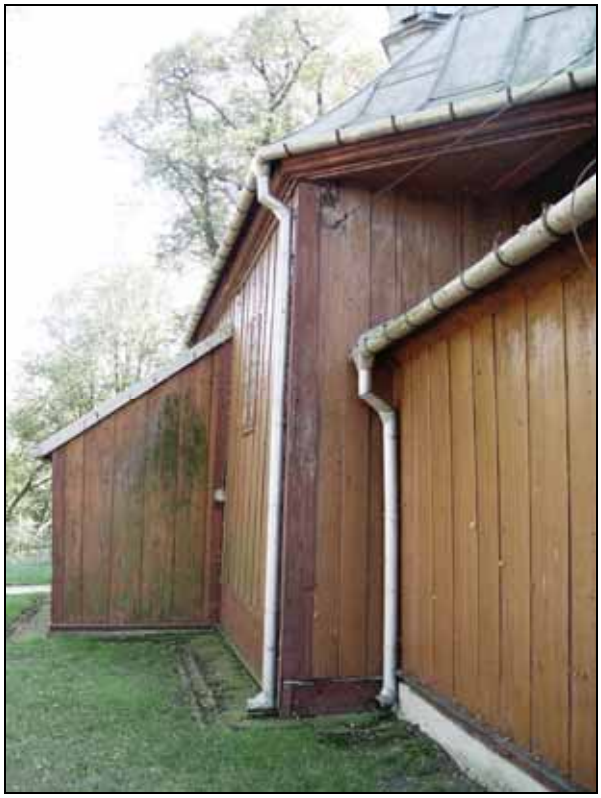
12. Brwilno Górne. Church of St. Andrew the Apostle. Church interior. Southwestern corner in the nave. The method of joining the logs at the corners is visible.

13. Brwilno Górne. Church of St. Andrew the Apostle. Sole plate in the southwestern corner of the nave. The saddle notch joint can be seen.

14. Brwilno Górne. Church of St. Andrew the Apostle. Sole plate of the southern wall of the nave. Wooden dowels can be seen.

15. Brwilno Górne. Church of St. Andrew the Apostle. Crowning cornice from the west hanging over the nave.





16. Brwilno Górne. Church of St. Andrew the Apostle. Fragment of the cladding of the nave from the north. The uncovered section shows the profiles of the boarding as well as their original color.
17. Brwilno Górne. Church of St. Andrew the Apostle. View of the northern and western facades. Cladding with the corner boarding can be seen.

18. Brwilno Górne. Church of St. Andrew the Apostle. Northeastern wall of the chancel. Supplementary cladding dating from the postwar period (1963).
19. Brwilno Górne. Church of St. Andrew the Apostle. View of the northern facade, the lower sections of the cladding, the drip strip, the damaged sole plate, and postwar supplementary work.

The cladding of the western porch is also made of boards arranged vertically, as is the case with the nave and other church rooms, which confirms that the porch was built prior to 1898. The gable ends of the western and southern porches have their board butt joined with strips and are deprived of any molding. Such a finish demonstrates later renovation or remodeling work on fragments of the facility. The cladding is painted with yellow–brown and dark brown oil paint; this was probably done in 1963. Uncovered sections clearly show the earlier color of the boards—brick–brown.

Window openings in the nave (two from the south, one from the southeast, and one from the north) are rectangular, terminating in a minor arch. Similar, although twice as small, is the window in the southern gable of the side porch.
There is a square window in the eastern facade of the sacristy.
Window and door frames are made of logs from the inside of the church, with molded edges, while from the outside, they are covered by molding (made at the same time as the cladding in 1898 and applied on top of the cladding boards).

20. Brwilno Górne. Church of St. Andrew the Apostle. Door frame of the entrance from the nave to the sacristy made of logs, as seen form the inside of the church, with molded edges.
21. Brwilno Górne. Church of St. Andrew the Apostle. Nave windows, southern facade.

Windows in the nave are of the casement type, single, double–sash, with cross muntins attached to the stiles using wooden dowels, with bipartite sashes subdivided into ten sections.
The window in the porch is a single–sash, fixed, window with cross muntins, subdivided into twelve sections, with stiles joined using wooden dowels.
The window in the sacristy is of the casement type, single–sash, with muntins, a bipartite sash, subdivided into four sections, hung on angle hinges.

22. Brwilno Górne. Church of St. Andrew the Apostle. Window in the porch with visible wooden dowels joining the frame.

23. Brwilno Górne. Church of St. Andrew the Apostle. Sacristy window.

Doors. The exterior door of the main entrance (probably from 1846) is a double door of panel construction, symmetrical, where each half has four panels with molded frame edges, and the panels have cover plates in the form of rhombuses with molded edges; the stile tongue is fluted in the form of a half–column. The door leaves are hung on forged strap hinges in the form of ogees with hobnails.
The second door is installed in the porch in the passage to the nave (it probably dates from the period of the building of the church, like the other doors in the nave specified below). It too is a plank and batten double door hung on forged strap hinges.
The other doors are single plank and batten doors hung on forges strap hinges with their original locks, bolts, and chains preserved (the door to the sacristy, side porch, and from the main porch to the nave).

24. Brwilno Górne. Church of St. Andrew the Apostle. Exterior door of the main entrance (probably 1846).
25. Brwilno Górne. Church of St. Andrew the Apostle. The second door in the porch installed in the passage to the nave (probably from the period of the building of the church).

26. Brwilno Górne. Church of St. Andrew the Apostle. Door to the sacristy on forged strap hinges with its original lock, bolt, and chains preserved.

27. Brwilno Górne. Church of St. Andrew the Apostle. Plank and batten door to the side porch hung on forged strap hinges.

Other elements of the architectural decor of the exterior facades.
A figure of the Sacred Heart of Jesus in a glassed concha niche is located in the exterior facade at the top of the western porch on the axis of the main entrance. The recess is finished in slats in the form of window framing. This niche was made in place of a window that was still in existence in 1959. The slats are decorated with symmetrical pillars at the sides, a palmette in the lower frame, and leaf ornaments as well as a keystone in the arch.

Roof—form, structure, and roofing.
The nave is covered by an eight–slope roof, the porches have double–sloping roofs, while the sacristy has a shed roof. The spire tower (rebuilt in 1846 and renovated in 1964, including the replacement of some elements) is located midway in the length of the church. It has two stories, a six–sided plan, and it crowned by a six–sided spire with a peak, globe, and cross.

28. Brwilno Górne. Church of St. Andrew the Apostle. The spire tower at the center of the roof ridge of the church nave, rebuilt in 1846, renovated in 1964.

THE ROOF STRUCTURE over the nave is a collar–beam structure with a longitudinal bracing framework, with king–posts and longitudinal braces in tension coupling the king–post with the longitudinal framework every other truss. The framework incorporates scissor braces in the form of crosses of St. Andrew.
The structure includes trench purlins.
The collar beam is joined to the rafters using a dovetail joint.

29. Brwilno Górne. Church of St. Andrew the Apostle. Roof structure over the church nave. Connection of the kingposts with the rafters of the ridge. Also visible are the longitudinal brace joints.

30. Brwilno Górne. Church of St. Andrew the Apostle. Roof structure over the nave. The longitudinal frame.


31. Brwilno Górne. Church of St. Andrew the Apostle. Roof structure over the nave. Rafters and trench purlins are visible.
32. Brwilno Górne. Church of St. Andrew the Apostle. Roof structure over the nave. Joints connecting the rafters and collar beams. Carpenter's marks are visible.


33. Brwilno Górne. Church of St. Andrew the Apostle. Roof structure over the nave. Connection of the rafters and collar beams on the north. Carpenter's marks are visible.
34. Brwilno Górne. Church of St. Andrew the Apostle. Roof structure over the nave. View of the tower and spire structure as well as neighboring roof structure members over the nave.


35. Brwilno Górne. Church of St. Andrew the Apostle. Roof structure over the nave. The rafters of the last truss form the west are marked by a carpenter's "x" that signifies its date as being contemporaneous with the oldest members of the roof structure.
36. Brwilno Górne. Church of St. Andrew the Apostle. Roof structure over the nave. Cladding boards covering the western wall of the nave are nailed to the beam of the last truss.

The rafters are connected at the ridge using a simple lap joint. There are carpenter's marks visible on the rafters and collar–beams. With the exception of the trusses in the area of the tower and spire, and of course the bell tower, the roof structure of the whole of the nave probably dates from the period of the building of the church.
In the western part of the church, the roof structure of the overhang probably dates from the time of the building of the church. The rafters of the last truss from the west are marked by an "x" carpenter's mark, thus bearing witness to such dating.
Cladding boards covering the western wall of the nave are nailed to the beam of the last truss. Thus, the cladding of the overhang was applied after the cladding of the nave and porch—i.e. after 1898.
The western porch has a collar–beam roof. The collar–beams are connected with the rafters using lap joints. The rafters are connected using lap joints at the ridge.
ROOFING over the whole of the church, including the tower, was installed in the nineteen–seventies. It consists of zinc–coated metal sheet joined using a seam joint.

1.2.2. Church Interior

Both the humble volume and the frugal architectural decor of the exterior facades is characteristic of Mazovian timber architecture of this period. The church interior is a continuation of these moderate guidelines: a single–space nave covered by a ceiling of boards with facettes, where the chancel is not isolated architecturally, amassing all major functions of a church and its related furnishings. The rood beam with a crucifix as well as the character of the polychrome painting is a relic of the subdivision of the nave into the sacred and profane.

37. Brwilno Górne. Church of St. Andrew the Apostle. Church interior with a view from the choir. The rood beam with a sculpture of the Crucified Christ can be seen.
38. Brwilno Górne. Church of St. Andrew the Apostle. Western porch attic. Fragment of the ceiling in the passage from the stairs to the choir entrance.

Two entrances lead to the church interior: the main entrance through the porch on the western side and the side entrance through the side porch on the southern side.
Western porch. The main entrance leads to a small, dark porch—a relatively low windowless room whose interior walls are covered by vertical lapped boarding, with chamfered edges. The porch is covered by a beamed floor with a ceiling of boards, where the boards are treated similarly to those of the wall cladding. The room has a floor of boards, where the boards are joined using a tongue–and–groove joint. Single run notchboard stairs lead from the porch along the eastern wall of the room.

These stairs lead to the porch attic and from there to a door opening formed by a secondary cut in the logs of the nave wall (a single door of boards on strap hinges).
The door leads to the choir that is on an *empore* in the western section of the nave.
A rectangular door opening with double plank and batten doors on strap hinges leading to the nave is located on the axis of the main entrance in the wall separating the nave from the porch.
Nave. The nave is reached beneath the *empore* choir, passing two four–sided post that support the structure of the choir floor and balusters crowned by a cornice.

39. Brwilno Górne. Church of St. Andrew the Apostle. Attic of the western porch. A fragment of the door opening made as a secondary cut through the logs of the nave wall (with a single door of boards on strap hinges) can be seen.

40. Brwilno Górne. Church of St. Andrew the Apostle. Interior view of the western wall of the nave with a fragment of the choir.

41. Brwilno Górne. Church of St. Andrew the Apostle. Church interior. A fragment of the choir balcony can be seen.

The nave is a single space covered by a boarded ceiling of beams (the boards use lap joints), with a facette made of slanting boards. A rood beam is located in the center of the nave, on it is a Late Gothic sculpture of the Crucified Christ separating the chancel section designated for the priest and the remaining space for the faithful. The beam is molded on the "faithful" side in a relatively irregular manner, in the form of quarter beads and quirks. The beam is painted using oil paint from the postwar years, thus hiding wording that was still visible in photographs from 1930.

The log walls of the nave are not clad. The outline of the logs is visible from under the polychrome layer that covers the entire surface of the logs and the boards of the ceiling with exceptional accuracy. The multicolored polychrome work is beautiful in color and artistry. It establishes a climate of the great age of this small church and serves as a supplement to the architecture and the facility's decor.

42. Brwilno Górne. Church of St. Andrew the Apostle. Church interior. View of the southern walls of the chancel with its multicolored polychrome work completely covering the log wall structure. Also visible in a window and window frame.

Initially the church was only whitewashed (traces are visible in uncovered sections).

The polychrome work was applied in 1914 (a description of the polychrome work may be found in the "State of Church Furnishings' section). The polychrome work up to a height of 170 cm (the probable height of earlier paneling) was supplemented during the interwar years on the northern, western, and southern walls. However, the climate, color scheme, and compositional principles of the paintings from 1914 are maintained.

The flooring is contemporary of boards arranged in square fields along or parallel to the axis of the church in line with earlier models (photograph from 1930).
A crypt is located beneath the chancel. It is probably of brick with a vaulted ceiling.
The northern wall of the nave contains a passage to the sacristy. The head of the door frame still bears the wording "Fundator Hug Ecclesiae I.R.M.K.P.P. An(n)o D(omi)ni 1740" written in tempera.

43. Brwilno Górne. Church of St. Andrew the Apostle. Church interior. The western wall of the nave over the choir. The uncovered section shows traces of whitewash—proof of the original finish of the church.

44. Brwilno Górne. Church of St. Andrew the Apostle. Contemporary flooring in the nave made in accordance with that existing earlier.
45. Brwilno Górne. Church of St. Andrew the Apostle. The doorframe head of the opening leading to the sacristy in the nave (northern wall) still bears wording in tempera.

Sacristy. The walls of the sacristy are rendered in plaster. The room is covered by a ceiling as in the nave. The flooring is of wide boards.

46. Brwilno Górne. Church of St. Andrew the Apostle. Interior of the sacristy. Southern, side porch. The side porch is clad and covered as in the western porch.
47. Brwilno Górne. Church of St. Andrew the Apostle. Southern, side porch interior.

1.2.3. The Bell Tower

A church cemetery functioned around the church. A bell tower from 1854 has been preserved within its grounds. (The date inscribed on the center structural post of the structure is from earlier 18th century members.) The historical structure has maintained its original structural members. The facade decor is from the postwar years. The facility raises the rank and aesthetic qualities of the entire church complex. There is a new bell in the bell tower; it was consecrated in 1947. Built of pine wood on a square plan using a post and beam structural system, it is clad from the outside using a vertical layout, without battens, and is spanned by a pavilion roof covered with sheet metal. The entrance into the bell tower is located in the southern facade of the facility. The corners of the bell tower are additionally stressed by thicker boards. Lisena strips subdivide each facade symmetrically.

48. Brwilno Górne. The bell tower on the church cemetery grounds. Southern and eastern facades.
49. Brwilno Górne. The bell tower on the church cemetery grounds. Northern and western facades.
50. Brwilno Górne. The bell tower on the church cemetery grounds. Structure of the bell tower and the bell.

The exterior cladding, in its upper sections, has two symmetrical rectangular window openings cut out from it that close in sections with wooden louvers. The exterior facades are painted, as in the case of the church facades, with oil paint of a yellow–brown color, with dark brown corners. The central post in the interior bears the inscription "1882." There is no doubt that this is not the year of construction of the bell tower (it may be the date of a renovation of the facility, which was not noted in any sources). The structure shows signs of missing members—struts and spandrels.
The building has no floor. The cladding is from the postwar years. This can be deduced from a 1930 photograph made by Father Turowski. On it the original cladding is clearly different from the present cladding, and the forms

of the windows is different (the windows were narrower and arched, though placed similarly in the facade). Archival sources also confirm this. The new cladding of the bell tower was probably installed in 1947—the year in which the new bell was made and placed in the bell tower. The new cladding most certainly existed prior to 1952—that is the year of information regarding a "new" bell tower "built after the war."

Tomb of Wincenty Poznański, Mayor of the Polish Army. The complex includes the mortuary chapel of Wincenty Poznański, Mayor of the Polish Army. It is of brick masonry, built on a rectangular plan, with rustic work framed by pilasters with ionic capitals, covered by a two–slope sheet metal roof. The tomb is rendered with neo–Classical plasterwork and sculptures representing winged angels and hourglass motifs.

51. Brwilno Górne. The church cemetery grounds. The mortuary chapel of Wincenty Poznański.
52. Brwilno Górne. The church cemetery grounds. The tombstone of Wincenty Poznański.

1.2.4. Fencing

The grounds of the former church cemetery are fenced. The fence was made in 1973 or 1974. It is a steel fence with a gate on the western side. The course of the fencing changes in the eastern section, which is connected with the shifting of the escarpment landslide line towards the church.

1.2.5. Old Tree Stands

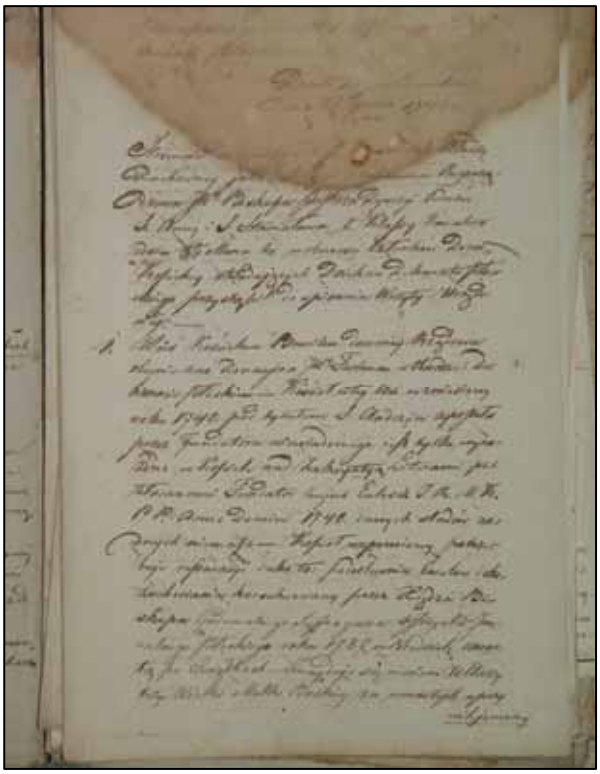
Two–hundred–year–old small–leaf lime trees within the church cemetery grounds are an inseparable element of the cultural landscape.
Notes from 1825 already mention that the church cemetery is "planted in trees." In 1924 there are "thirteen large lime trees and a maple tree," while next to the entrance to the church near a large cross from 1887 there are "two pear trees." There are "seven old lime trees and one maple tree" on the cemetery grounds near the bell tower, while "on the grounds of the organist's cottage near the church fencing" (from the southern side), there are "five old lime trees," which is one lime tree less. Today, there are still seven old lime trees on the church grounds.

53. Brwilno Górne. View towards the Church of St. Andrew the Apostle from the northeast direction. Partially visible in the foreground is an old lime tree growing on the church cemetery grounds for two hundred years.

1.3. Historical Data

1.3.1. The History of the Brwilno Village and Parish

Brwilno, formally known as Brwielino and Brwilino, is a name derived from Brwiel or Brwioł—brow, brows. In the Middle Ages the village was the property of wealthy nobility of the Prawdziwiec family. At the start of the 15th century it belonged to the Gulczewskis and from the year 1444 to the mid–17th century to the Kryskis—both knightly families well known throughout the Mazowsze (Mazovia). In the first half of the 16th century it was one of the largest gentry–owned villages in the area. In 1651 it passed from the hands of Dorota Berżewicz nee Kryska to the Bishop of Płock who deposited Brwilno with the Norbertines of Płock, inclusive of the right of patron for the church. In 1757 the property passed to the Treasury of the Commonwealth from which it was taken over by Ignacy Zboiński, Castellan of Płóck. Following the Partitions, the property again passed to the treasury. Brwilno then became the center of many government properties. A "donatio" grange, Brwilno was a part of the Łąck majorat, belonging first to Roman Fuhrmann, the Tsar's Master of the Royal Hunt and Chairman of the Government Revenue and Treasury Commission, and successively to his son Nicolaus and grandson Gregory. In 1930 it became the property of the Jabłoński Family.
The parish was established in the 12th century. Initially, it only encompassed Brwilno itself. Thus, it was probably a knightly foundation. The first church—devoted to St. Andrew, as is the case today—was most probably built in the 12th century, although there is no mention of it prior to 1395. As of the 14th century, the Norbertine monastery had a rectory here. Fishing flourished in Brwilno and there was a monasterial granary. The church that existed at the end of the 16th century had a chancel with an altar devoted to the Assumption of the Holy Virgin Mary as well as two side altars—St. Christopher's and St. Catherine's. A successive church was built in the 17th century. It was founded by S. Kryski, the Voivode of Płock.
The present church was built together with a bell tower in 1740 by Father Mateusz Krzemiński, the Norbertine rector. It was consecrated in 1787 by Wojciech Józef Gadomski, auxiliary bishop of Płock.



54. Card from the bishop's inspection in 1842, Płock Diocesan Archives.

55. The church complex in Brwilno Górne, view from the northwest, 1930, Płock Diocesan Museum.

Two bells were described in the bell tower during the bishop's visit in 1776—one from 1223 and the other from 1558. As is seen in the description from the year 1930, the older and smaller bell bore the words "MARIA+THOMAS+STANISLAUS 1223," while the larger one stated "IESUS NAZARENSSKY KRUL SŁOWO BOSENEPRSE MENETRFNEBIEY NASEMI NA VIEKY," with the word "SIDOFSRY 1558," below.
An organist's cottage was built to the south of the church in 1802. It was a three room house, "erected by timber frame," thatched, and provided with a small barn and pigsty. This cottage was later called the "hospital" as it served as home to the organist and "paupers." In 1845 half the building served as the house of the organist, while the other half was a school. Remnants of the organist's cottage were demolished around 1973.

In 1812 the church was described as being of wood, small, worthy, provided with new shingles as well as three altars that were "beautiful and ornate, with everything glided," a worthy pulpit, a confessional (standing south of the eastern door), pews, and an organ with seven voices. The main altar had a "blue dress on the Blessed Mother embroidered in silver flowers." There was also a sacristy entered from the church interior. The cemetery was "fenced," with the exception of three sections that were missing "for reasons of a gap in the earth to the east." The bell tower was worthy with three bells—a third, added to the two already described in 1776, was medium in size and bore the word "MIRA." The "mortuary" (funerary chapel) was in need of renovation work—new roofing. The choir was worthy and had an organ.
In 1818 the cemetery around the church was "fenced with pickets," old, and in need of repairs. It was built overlooking a deep ravine and in danger of sliding downwards.
In 1825, the "timber church, roofed in shingles, with porches from the west and south added" was in need of repairs. The church was surrounded by a cemetery fenced on three sides—"excluding the east where gaps in the earth and a great gully made fencing impossible—planted with trees. The bell tower and funerary chapel were in need of repairs.
A tomb—catacombs covered by an iron roof—was erected in the church cemetery in the eighteen–thirties. In it were interned three bodies, including that of Wincenty Poznański, Major of the Polish Army.
In 1838 the church required "dressing and shoes"—cladding and sole plate replacement. New shingles were laid on the roof. The bell tower was in a very poor condition and required re–erection. The fenced cemetery was overgrown by trees and the fencing was in need of repair work.
In 1839 the church continued to require "dressing and shoes." The roof had good shingles. The bell tower was old and in poor condition. The fence needed repairs.
In 1840 the Government District Builder drafted a design and *anszlag* [cost estimate] for a new bell tower. However, the costs of building the new facility exceeded the financial potential of the parish.
In 1841 the church was in need of repairs—"dressing for the walls and shoes," the roof was covered by shingles, the bell tower was old and rotted, the wooden fence was in need of repairs.
In 1842 the church was in "poor condition" and needed work as described previously. Additional "preparing" was needed by the roof, cupola (rood spire), and sacristy roof. The bell tower with three bells required rebuilding. The fence required repairs. The funerary chapel, clad with boarding, had an opening in the side.
Inspections in 1843, 1844, and 1845 confirmed the above state of the complex.

56. The church complex in Brwilno Górne, 1930, Płock Diocesan Museum. Fencing from 1925 in the foreground. To the left of the western porch is a cross from 1887 and two pear trees growing next to it.
57. The church complex in Brwilno Górne, view from the east towards the chancel and catacombs,1930, Płock Diocesan Museum.

The church was renovated in 1846. A new spire—the cupola—was erected in the place of the rotted one on the church. Cladding on the cupola, church, both porches, and sacristy consisted of newly installed shingles. Sole plates beneath the sacristy and porch were replaced. New floors were installed in the porch and sacristy and a new door was made for the porch. The bell tower was old and rotted. There was a need to build a new fence.
A new bell tower was built in 1854; it is possible that beams from the old one were used. Material used was pine wood with oak sole plates, cladding was of pine boards. Two bells were hung in the tower, the third one was chipped—in line with the description of 1930 this may have been the 13th century bell (the wording on that item from the year 1930 was "MARIA+THOMAS+STANISLAUS 1223-1894+," where the second date may relate to the repair work).
In 1855 the church was in good condition, but the fencing in a poor state. The same was true in the year 1856. In 1859 the church and bell tower were in good condition, the fence no longer existed.
A large wooden cross was erected next to the entrance to the church and two pear trees were planted next to it.
The 13th century bell was probably repaired in 1894.

In 1898 the church was renovated by Father Tomasz Kowalewski. Both porches were rebuilt and the church was reclad using pine boards coated with oil paint. The porches were not made using logs as had been the case before, but of "double boards on a framework of studs." Moreover, galvanized sheet metal was applied to the roof of the church and spire—"zinc–plated sheets of iron below." The sheet metal was painted red.
Around 1914 Father Maciejowski renovated the church and applied polychrome paintings to the interior. The roof required painting in 1920. The fencing was wooden, of "rods." The catacombs were in good condition. Fourteen lime trees, one maple tree, and a lilac shrub were growing in the cemetery. The path around the church was weeded. The bell tower still had three bells—the Germans did not take any during World War I, "apparently they were dumbfounded by the Lord." The wooden floor was in good condition.
In 1922, during the sojourn of Father Henryk Lipka, the roofs on the church and bell tower were repaired as were gutters and downspouts, the roofs were painted. The work was performed by the Józef Kwiatkowski Metalworking Shop of Płock.
In 1924 the entire building started leaning in a southerly direction. The church was lined by stone masonry. The interior walls were without boarding, the ceiling was straight, the wooden floor was partially damaged. There were thirteen large lime trees and a maple tree in the cemetery. There was a fence of "laid boards" with one large and two small gates; the state of the fencing was unsatisfactory. The bell tower had no flooring inside and three bells (of which one was not used "due to its disharmonious sound"—perhaps the repair work on the 12th century bell proved unsuccessful). The catacombs were "derelict and without any owners."
In 1925 the church cemetery was surrounded by a fence of pine pickets and oak posts. The main gate was of oak posts, as were the two small gates flanking it. The church and bell tower roofs were coated with paint. A mission cross was erected to the right of the western porch in 1928.
In 1930 Father Henryk Lipka, the rector, asked the parishioners of Brwilno, including those living abroad, for donations for the remodeling and "repair" of the church.

58. The church complex in Brwilno Górne, view of the choir,1930, Płock Diocesan Museum. An inscription, no longer visible, can be seen on the rood beam.

59. The church complex in Brwilno Górne, tombstone,1930, Płock Diocesan Museum.

In 1931, the figure of the Blessed Mother on the main altar was replaced by a figure of the Sacred Heart of Jesus, founded by the already deceased Adam Lipka (perhaps a relative of the rector). The church roof was coated with red oil paint. The walls were in good condition, the wood was healthy, but all church sole plates were rotted. The bell tower was in poor condition. There was one large wild pear tree in the cemetery, seven old lime trees and one maple tree near the bell tower, and five old lime trees near the church fencing. The catacombs were in a state of neglect.

Traces of foundations were visible near the bell tower. It was then suspected that these were the foundations of an earlier church that stood "as witnessed by old documents," next to the existing one. However, these were most probably the foundations of the old funerary chapel. The organs were shipped for renovation by the Dominik Biernacki Company in Włocławek.

In 1936 the state of the church was "passable." Sole plates were rotted beneath the entire church. The entire church leaned in the southern direction.
In 1937 the church was described as in need of major renovation work, or even that it would be "better to build a new one." The same was true of the bell tower.
In 1938 the galvanized gutters were somewhat damaged. The state of the walls was acceptable. The sole plates were rotted beneath the entire church. The entire church was leaning towards the south. The bell tower was also in poor condition. The catacombs were in a state of neglect.
The church was closed during World War II following the arrest in 1941 of Father Stanisław Kobyliński, who later lost his life in the Nazi camp at Działdowo. The Nazi's robbed the bells and church linens.
On March 28, 1945, Father Zawistowski, administrator of the parish of Brwilno, "after five years of absence of a chaplain in the parish as a result of the taking away of the entire deaconage of priests to the camps," surveyed the facilities: the church roof leaked, the sole plates required repairs, the state of the walls was acceptable, the bell tower was in good condition, the fencing had rotted pickets, and the catacombs were neglected.
In 1947 Bishop Tadeusz Paweł Zakrzewski consecrated a new bell; it was given the name of "Andrew."
In 1951 the parish administration applied to the state authorities for the allotment of 500 "threescore" of shingles.
In 1952 the church required the renovation of its sole plates and roof. There is information that following the war the bell tower was "built" (it was only newly clad), a bell was funded, and a reinforced concrete bridge was build across the gully to the burial grounds (no longer in existence today).
In 1953 Father Zawistowski, the rector, asked the Municipal Renovation and Construction Company to extend the power line and lighting to the church and rectory. That same year the church and rectory were electrified.
A cost estimate was developed for a lightning protection system in 1954. The church roof required covering and the church itself renovation. The rector asked the parishioners for donations, where the greatest needs included cement, structural lumber, and boards.

60. The church complex in Brwilno Górne, 1959, Płock Voivodeship Conservator General Archives. A window is visible over the main entrance of the church, which was subsequently converted into a niche for a figure of the Sacred Heart of Jesus.
61. The church complex in Brwilno Górne, tombstone,1972, Płock Voivodeship Conservator General Archives. View of the freshly rendered facade.

As of at least 1959, the church cemetery had a new fence of wooden pickets. Prior to that year, some of the church, porch, and sacristy sole plates were replaced with masonry work.
The year 1963 saw the replacement of the damaged section of the church's exterior cladding and its painting. Certain elements "in the tower" were replaced in 1964.
The need for renovation work resurfaced in 1969.
The tomb was renovated in 1972; the facility's facade was rendered.
The church complex fencing was replaced with a new metal fence in 1973 or 1974. At some time between 1959 and 1975, the statue of the Blessed Mother was returned to the main altar, while the figure of the Sacred Heart of Jesus was place in a niche built in place of a window above the church's main entrance.
In 1981, an idea on the part of the Płock Voivodeship Conservator General to move the church to the open–air museum in Sierpc received a negative opinion by the Department of Faiths of the Voivodeship Office of Płock. The church continues to be used for worship.
The escarpment in the eastern part of the church complex collapsed in 2002. A part of the fencing as well as old lime trees fell into the gully. This active landslide was temporarily secured in the autumn of 2003 and the eastern fencing was rebuilt in 2005.

1.3.2. The History of the Church

A timber church erected in 1740 of larch logs on oak sole plates, single–nave using a notched–log construction system, oriented traditionally, hall with a chancel that is not isolated from the nave terminated by three walls, with a single–ridge shingle–covered roof, flat ceiling, uncovered interior walls, and a wooden floor. Most probably, the church was not clad originally. The spire, with a bell, on the church roof may have been present from the very beginning (although it is a fact that the first mention of it does not appear until 1842, but the "cupola" was already in need of "work"). A sacristy was added to the main body from the north, with a connection to the interior of the church. A foundation plaque was placed in the sacristy lintel—"IR MK PP," which most probably pertains to Mateusz Krzemiński, as well as the date 1740. The church had two entrances: from the west on the axis of the front facade and from the east, in the central part of the body. It was furnished in three altars: the main altar—late–Renaissance from the beginnings of the 17th century moved from the Norbertine church in Płock after the liquidation of the order—and two side altars, where the one on the right is late–Renaissance from around 1630, purchased during construction of the church from the Franciscan church in Dobrzyn on the Vistula, while the left one, the altar of At. Anne, was founded by the "peregrina" Sadowska immediately after the building of the church. The founder was laid to rest there after her death. The church was provided with a rood beam with a late–Gothic crucifix from the first half of the 16th century. There is also a choir in the west supported on two posts with an old seven–voice organ, said to have been rebuilt from the old organ of the church in Sikorz. The chancel was separated from the nave by a low barrier, probably from the very beginning. In 1812 the church already has a new roof covering—shingles (shakes). In addition to the altars and organ, the church also had a pulpit, confessional, and pews. Information appeared in 1825 that two porches were added to the church—one from the west and a small one from the south. It is then that the church required "repairs." In 1838 that information became more concrete: the church required cladding ("dressing") and the replacement of the sole plates ("shoes"). The roof was again reroofed with shingles. However, the necessary work was not performed and 1842 sees the appearance of the additional problem in the roofs—the roof, spire (cupola) and sacristy roof required "work." Renovation work was conducted in 1846: a new spire was raised and the church spire, sacristy, and both porch roofs were covered by shingles. Sole plates beneath the sacristy and porch were replaced. New flooring was installed in the porch and sacristy, and a new door was made for the porch. Successive renovation work was conducted in 1898; it was probably only then that the church walls were clad in pine boards coated with oil paint and the two porches were completely rebuilt (these were not made using logs as had been the case before, but were made of "double boards on a framework of studs"), the roof covering was replaced using zinc–plated sheet metal painted red. It was most probably then that a stone band was built around the structure. The next work was executed in 1914, when the church was "remodeled," and the interior received its essentially unchanged to today polychrome paintings on the ceiling and walls. What are missing today are signs on the rood beam: "My house is a house of prayer" (on the west side) and "JUBILATE DEO OMNIS TERRA" (on the east side). The church survived World War I in good condition. The year 1920 only noted that the roof required painting. The church roof was painted in 1922 and the gutters and downspouts were repaired. Disturbing news stems from the year 1924: the entire church was leaning in the southerly direction, and therefore required immediate replacement of the sole plates. The flooring was also damaged. The church roof was painted in 1925.

62. The church complex in Brwilno Górne, interior,1930, Płock Diocesan Museum. A new painting funded by the Rosary Society is visible in the retabulum of the side altar.
63. The church complex in Brwilno Górne, after 1975, Płock Voivodeship Conservator General Archives. In the foreground is the new metal fencing. A niche for a figure of the Sacred Heart of Jesus was built in the place of a window over the main entrance.

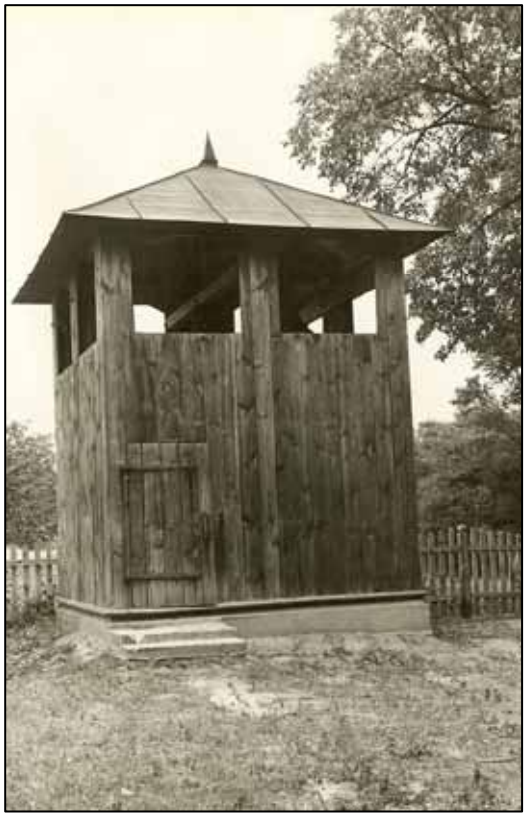
In 1930, the painting of St. Anne of the left altar was replaced by the Holy Rosary Society (created in 1929 out of the former Society of St. Andrew) with a painting of the Blessed Mother of the Rosary. In 1931 the figure of the Blessed Mother on the main altar was replaced by the figure of the Sacred Heart of Jesus funded by the then deceased Adam Lipka. The condition of the church was poor and even the building of a new one was considered

in 1937. The church was electrified in 1954. Major renovation work was not conducted until between 1954 and 1959—the church, sacristy, and porch sole plates were replaced by new masonry structural members and the roof covering was replaced. Damaged section of the wall cladding were replaced in 1963 and the cladding was repainted. The spire structure was renovated in 1964. The figure of the Blessed Mother was returned to the main altar after the war.

1.3.3. The History of the Bell Tower

Oldest sources note that a timber bell tower was raised in the northwestern corner of the church complex together with the existing church in 1740. Two bells were hung in it in 1776—one from 1223 and a second, larger bell from 1558. There is no information as to their origins—an older Brwilno bell tower or from some other church. The older, small bell bears the wording "MARIA+THOMAS+STANISLAUS 1223," while the larger one states "IESUS NAZARENSSKY KRUL SŁOWO BOSENEPRSE MENETRFNEBIEY NASEMI NA VIEKY," with the word "SIDOFSRY 1558," below. Information dating from 1812 notes that the bell tower was in good condition and that three bells hung in it. A third, medium bell with the word "MIRA" had been added. At that time a timber "mortuary"—a funerary chapel—stood immediately next to the bell tower (perhaps added to it). Its entrance was from the side and it then required new roofing. The technical state of the bell tower and the mortuary worsened and in 1825 they both required renovation. In 1838 the state was so bad so as to suggest that a new one be erected. There is no information at that time regarding the funerary chapel, perhaps it was not longer in existence. In 1840 the Government District Builder drafted a design and *anszlag* [cost estimate] for a new bell tower. However, the costs of building the new facility exceeded the financial potential of the parish. A new bell tower of pinewood with oak sole plates, cladded in pine boards, without flooring was not built until 1854, perhaps using logs from the previous one. It was there that two bells were hung, the third was chipped.

In line with the description of 1930 this may have been the 13th century bell (the wording on that item from the year 1930 was "MARIA+THOMAS+STANISLAUS 1223-1894+," where the second date may relate to the repair work). Miraculously, all three bells survived World War I. They were not "robbed" by the Germans as had happened in other cases in the area. The roof was repaired and painted in 1922. Information from 1924 states that one of the bells—probably the 13th century bell, repaired in 1894—was not used "due to its disharmonious sound." The roof was again painted in 1925. The facility was in poor technical condition in 1931 and a suggestion crops up in 1937 that a new church be built. The bells were robbed by the Nazis during World War II. It was probably in 1947, prior to the consecration of a new bell—Andrew—that the wall cladding was replaced.



64. The church complex in Brwilno Górne, bell tower, 1972, Płock Voivodeship Conservator General Archives.

1.3.4. The History of the Church Cemetery

There is no doubt that the church complex of Brwilno received new fencing in the year 1740—the date of the erection of the church and bell tower. The church was surrounded by a cemetery—the only one up to the beginnings of the 19th century. However, sources provide no information regarding tombstones. In 1812 the fencing surrounding the cemetery was made of wood and consisted of sections. Three sections were missing on the eastern side "for reasons of a gap in the earth to the east." That was the edge of a deep escarpment. Notes from 1818 provide information that the fence was in poor condition and made of pickets as well as of a danger on the eastern side of a landslide. The year 1825 provides the first mention of high vegetation stating that the cemetery is "planted in trees." A tomb–catacomb was erected in the church cemetery in the eighteen–thirties. It was covered by an iron roof and was the resting place of three. Epitaphs still hang on the walls of this facility: "Wincenty Poznański, Major of the Polish Army, born April 10, 1797, died May 24, 1835, a life full of glory"; "Joachim Bożewski, born March 19, 1777, died February 25, 1827, leaving his wife and children behind"; "Kordula Solecka nee Borzewska, a model of wifely virtues who at the age of twenty–one years died on June 30, 1831." In 1838 the tree–covered cemetery was surrounded by a fence in need of repair. In 1859 the fence no longer existed. A large wooden cross was erected next to the church entrance in 1887 and two pear trees were planted next to it. The fencing was again mentioned in 1920—a wooden fence of pickets. The catacombs were in good

condition. Fourteen lime trees, one maple tree, and a lilac shrub were growing, and the path around the church was weeded. In 1924 there were thirteen lime trees. There was a fence of horizontal boards with a large and two small gates surrounding the cemetery. The condition of this fence was unsatisfactory. This state of affairs changed in 1925 when a fence of pine wood pickets and oak posts was built. The main gate as well as the small gates flanking it were also of oak posts. In 1931 a large wild pear tree was growing in the cemetery, there were seven old lime trees and one maple tree near the bell tower, and there were five old lime trees on the grounds of the organist's cottage near the church fencing on the south. The catacombs were neglected. In 1945, the fencing had rotted pickets. A new fence, again a picket fence, is visible in a photograph dating from 1959.
In 1972 the catacombs were subject to running maintenance work; it was then that the facades were rendered. The fencing of the church complex was change in 1973 or 1974 to a new, metal fence.

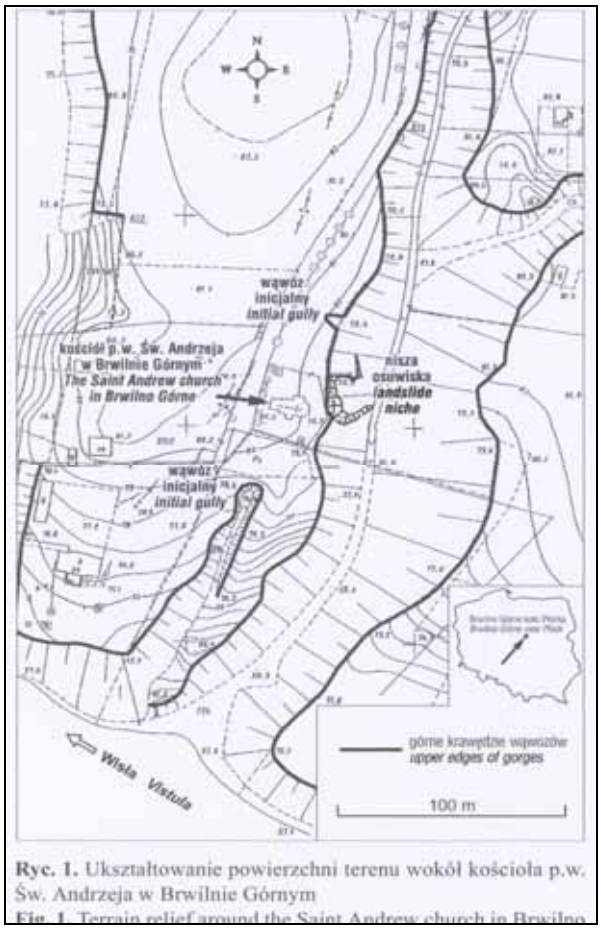
65. The church complex in Brwilno Górne, 1959, Płock Voivodeship Conservator General Archives.

2. Church Site Soil Studies

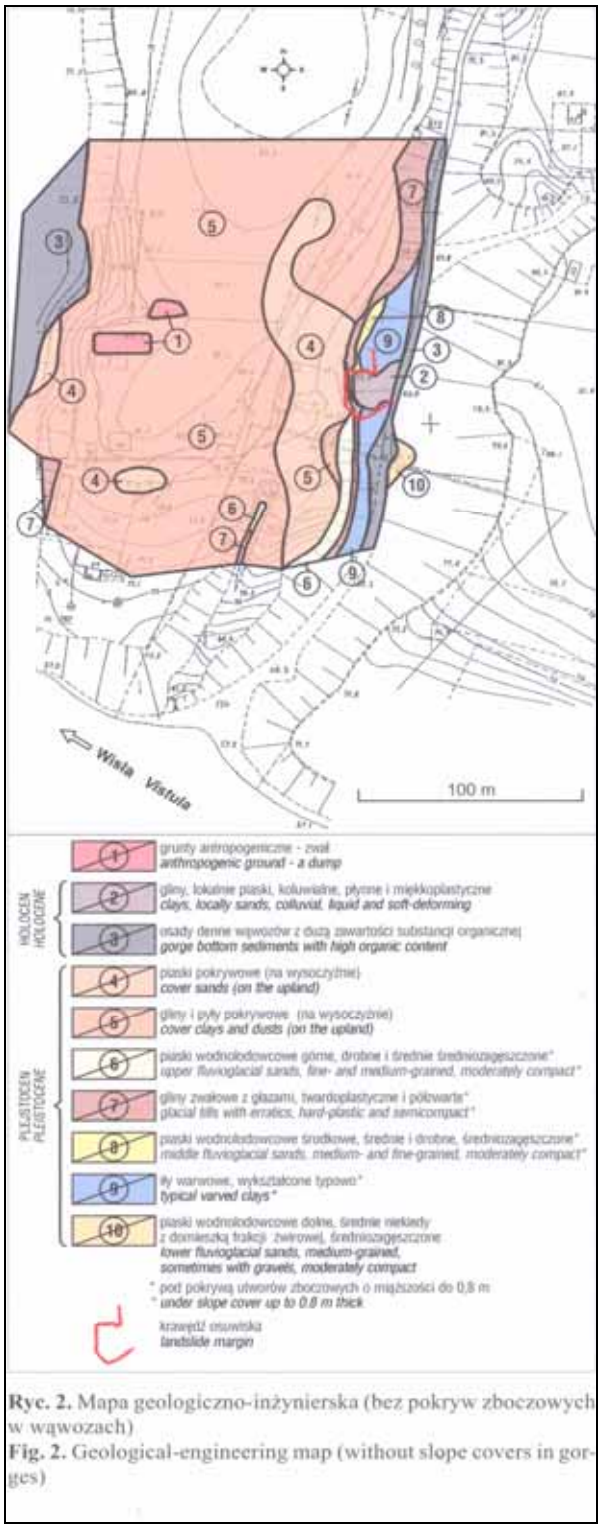
Soil studies were conducted in connection with the emergence of a threat to the historical church complex—especially the church building itself—since the appearance of renewed landslide activity of the escarpment in the immediate vicinity of the facility. The edge of the landslide that occurred in the spring of 2002 is drawing closer to the eastern wall of the church—a distance of 7 m. However, slope failure processes apply to the whole of the church environs. Emergency action was taken at that time. Several operations were undertaken aimed at stabilizing the soil (these questions are discussed more broadly in the section relating to threats facing the church).
Geological studies were performed as an absolute necessity in this case. "Geological–Engineering Documentation for Defining Possibilities for Securing and Rebuilding the Escarpment in the Area of the Historical Church of St. Andrew Complete in Brwilno Górne" [in Polish] was drafted by a team of specialists—Prof. Andrzej Drągowski, Ph.D., Prof. Zygmunt Glazer, Ph.D., P.E., Krzysztof Cabalski, M.S., and Michał Radzikowski, M.S.—in July of 2003.
Geological–engineering studies were conducted in line with strictly defined guidelines and timetables. Field work was conducted from March 20, 2003 to July 2, 2003. Laboratory testing of soil samples was performed by E. Falkowska, Ph.D. in the laboratories of the Chair of Environmental Protection and Natural Resources of the University of Warsaw. Chemical tests on ground water samples were performed by the POLGEOL S.A. Geological Company Research Laboratories. The program for immediate securing of the landslide in the area of the church was developed by Prof. Z. Glazer, Ph.D. and K. Cabalski, M.S. The objective of the documentation was the evaluation of geological and engineering conditions in terms of possibilities for securing the historical church against the impact of the nearby landslide.
During the study, special attention was paid to hydro–geological questions. As a result of the conducted research, the landforms of the area were identified, as were its geo–dynamic processes.
It was established that the church is located on the edge of a morainic plateau primarily built of post–glacial clays resulting from the northern Polish glaciation. The surface of the plateau is gently sloped in the direction of the Vistula River valley. There are several ravines in this zone that drain ground waters from the first level, leading them over the surface to the Vistula River. The bank of one of these ravines, one within which there are active movements of the mass, is located 7 m east of the church. The sides of this ravine have a slope of approximately 40° and, at times, reach a height of approximately 20 m. The ravine has its start about 350 m north of the church. Its length is approximately 500 m and it ends in the Vistula River valley. Smaller ravines join it. One of these has a length of about 50 m and a relative depth of 4–5 m. It starts at a distance of approximately 35 m south of the church. The landslide headwall goes into the side about 18 m, where the upper edge of the landslide amounts to 10 m and the slope is almost vertical. The church is 7 m from the upper edge of the landslide.

Shaping of the surface of the terrain around the Church of St. Andrew in Brwilno Górne. Drawing from the "Zagrożenie budowli zabytkowych związane z rozwojem czynnych procesów geodynamicznych na przykładzie kościoła św. Andrzeja w Brwilnie Górnym" [The Church of St. Andrew in Brwilno Górne: Threats to historical buildings in connection with the development of active geo–dynamic processes – A case study] by Andrzej Drągowski, Krzysztof Cabalski, and Michał Radzikiewicz in *Przegląd Geologiczny* [Geological Review], vol. 53, no. 9, 2006, pp. 784–785.

Geological–engineering map (excluding slope covers in the ravines). Drawing from the "Zagrożenie budowli zabytkowych związane z rozwojem czynnych procesów geodynamicznych na przykładzie kościoła św. Andrzeja w Brwilnie Górnym" [The Church of St. Andrew in Brwilno Górne: Threats to historical buildings in connection with the development of active geo–dynamic processes – A case study] by Andrzej Drągowski, Krzysztof Cabalski, and Michał Radzikiewicz in *Przegląd Geologiczny* [Geological Review], vol. 53, no. 9, 2006, pp. 784–785.



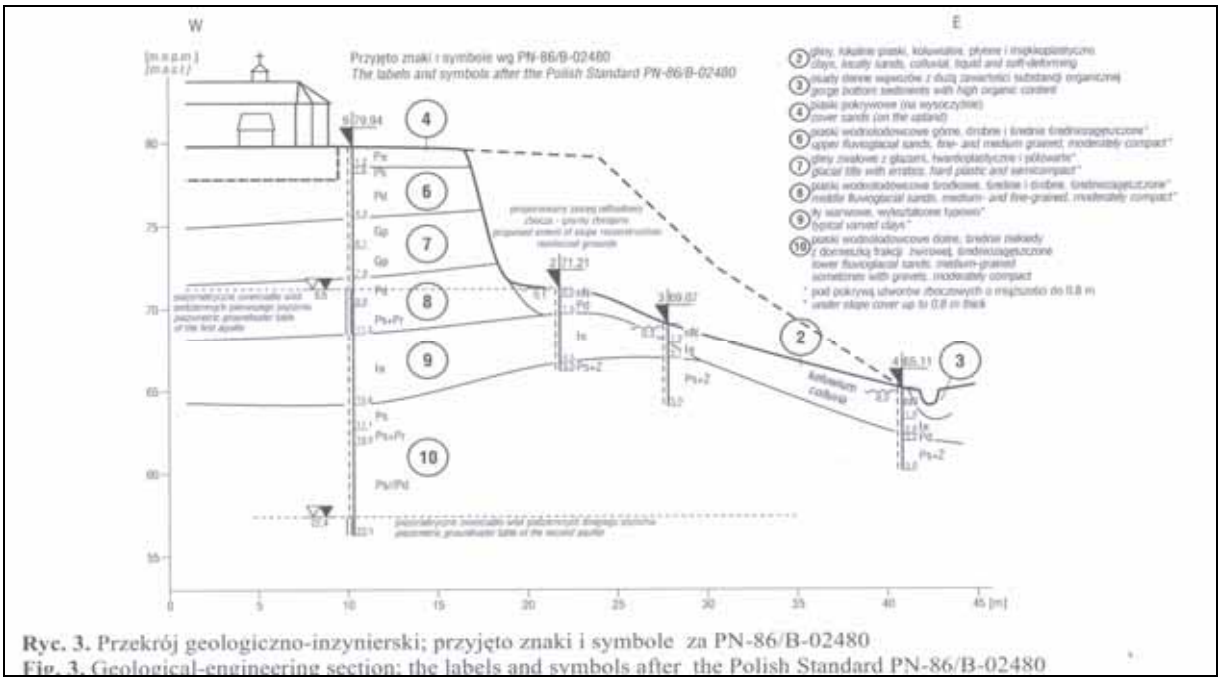
Ryc. 1. Ukształtowanie powierzchni terenu wokół kościoła p.w. Św. Andrzeja w Brwilnie Górnym
Fig. 1. Terrain relief around the Saint Andrew church in Brwilno



Ryc. 2. Mapa geologiczno-inżynierska (bez pokryw zboczowych w wąwozach)
Fig. 2. Geological-engineering map (without slope covers in gorges)

The geological formations of the investigated region include Tertiary formations (Pliocene) as well as Quaternary formations (Pleistocene and Holocene). The geological structure is illustrated by the attached geological-engineering map as well as cross–sections (contained in the above documentation …). In the church zone, the authors of the documentation isolated ten soil complexes.

Following tests and their subsequent analysis, it was agreed that the soils of layers 8 and 9 should be treated as sinking due to their grain. It was decided that two water–bearing layers linked with non–firm soils were of significance in the examined region. The first appears in the area of sandy layer No. 8, while the lower one is in the area of layer No. 10.



Rye. 3. Przekrój geologiczno-inżynierski; przyjęto znaki i symbole za PN-86/B-02480
Fig. 3. Geological-engineering section; the labels and symbols after the Polish Standard PN-86/B-02480

Geological–engineering cross–section. Symbols and labels used as in Polish standard PN–86/B–02480. Drawing from the "Zagrożenie budowli zabytkowych związane z rozwojem czynnych procesów geodynamicznych na przykładzie kościoła św. Andrzeja w Brwilnie Górnym" [The Church of St. Andrew in Brwilno Górne: Threats to historical buildings in connection with the development of active geo–dynamic processes – A case study] by Andrzej Drągowski, Krzysztof Cabalski, and Michał Radzikiewicz in *Przegląd Geologiczny* [Geological Review], vol. 53, no. 9, 2006, pp. 784–785.

The water table of layer No. 8 demonstrates a significant drop in the direction of the Vistula River with a slight slope westwards in the area of the church. Overall, this is the general, regional direction of water flow from the layer. However, the direction of flow in the area of the bank has a slight eastwards tendency. This phenomenon is connected with the drainage of this layer through minute springs occurring in zones of erosion cuts through the deluvian cover. One of these water seepage zones was at the foot of the landslide headwall (June 2003), thus resulting in accelerated geo–dynamic processes in this region.
There is a successive water–bearing layer in the area of Layer No. 10. The water–table for this level is unrestricted in character in the area of the church. There is an aeration layer above it. The direction of water flow in this layer is in agreement with the direction of water flow in the layer lying higher up. Hydraulically, this layer is strictly tied with the surface waters of the Vistula River (which was confirmed on the basis of the dept of deposition and the unrestricted character of the table). Values for the coefficient of infiltration for this layer are somewhat higher than those specified for the water–bearing layer over the clays. Both water–bearing layers represent the same hydro–technical type of ground water.

3. Expert Report on the Present State of the Building Inclusive of the State of Its Substance, Structure, and Foundations

The most significant elements with an impact on the technical state of the building are its stone foundations, timber load–bearing walls, and roof structure.
Any determination of the technical state of the foundations at this time is impeded due to lack of access. However, it should be borne in mind that as a result of many years of improper elimination of precipitation, sections of the foundations may require reinforcement. The building is founded in the immediate vicinity of a high escarpment that is subject to landslide processes, which may have significant impact on the uneven settling of church foundations.
It is only possible to evaluate the surface of the timber logs of the church's load–bearing walls on the interior side because the exterior is hidden due to cladding. The interior surface of the walls does not display any significant damage caused by the development of biological corrosion. However, it may not be ruled out completely. A cause for concern is the numerous cracking of the interior polychrome work at the joints of the wall logs, which may be evidence of the instability and low rigidity of the walls resulting in excessive movement during strong wind loading. However, premature conclusions should not be drawn from the above–described damage as it may have occurred during an earlier period during the elevating of the church walls during the replacement of sole plates in the nineteen–fifties. During examination, excessive settling of the timber wall in the southeastern corner near the chancel was noted, as was the major deformation of the western wall of the church nave. The reason for the settling of the southeastern corner is the biological corrosion of the sole plate in that area. However, it is difficult to unequivocally assess the reasons for the skewing of the western wall of the nave.

One reason may be the leaning of this part of the church in a southern direction as a result of the biological disintegration of the sole plate, signaled in sources dating from 1936. Another reason for the decreasing rigidity of the wall may be the creation of a secondary opening at the level of the choir *empore*. However, in such a case there would be obvious movement of wall logs at the choir level. No such horizontal shifting has been noticed. A third hypothesis for the above–specified damage is the improper execution of the dowels coupling the logs, their excessive clearance, or biological corrosion. The checking of the state of the dowels would necessitate the performance of destructive uncovering over a significant surface, which is not justified. Regardless of the decision taken by the author of the facility renovation design documentation—the aligning of the skewed wall or not—the western wall of the nave requires reinforcement, such as the execution of special cladding on the western side. An exact defining of the technical state of the church walls and the scope of potential reinforcement will not be possible prior to the removal of the exterior cladding. That will also be the moment to take decisions regarding the possible hiding of wall thermal insulation beneath the cladding.

66. Church of St. Andrew the Apostle in Brwilno Górne. Visible skewing of the western wall of the nave.

The ceiling of the nave shows major sagging reaching over a dozen centimeters in the central section near the rood beam. The structure of the ceiling consists of timber beams supported by the longitudinal walls. Lapped boards are nailed to these beams. This boarding, covered by polychrome work from the bottom, was subject to long–term dampness at points due to leaks in the roofing. In terms of biological corrosion, its state is not satisfactory and even, poor in certain places.

The state of the ceiling beams also varies. A major number of them demonstrates symptoms of biological corrosion primarily caused by feeding on the part of the cause of the damage. Estimates of loss in beam cross–section may even approach 20%–25%. Traces of a light–yellow dust has been identified in several places on the upper surface of the boards, which may be evidence of active feeding processes by insects. In connection with the need to preserve the existing ceiling due to the presence of the polychrome work, comprehensive impregnation of the boards from the upper surface using Antox B should be conducted.

The technical state of the ceiling and its excessive sagging is directly linked with the state of the roof structure. Although true that it was completely built using a collar beam system and therefore is not directly supported by the ceiling beams, due to the timber frame–grid system, its load–bearing is strictly tied with the load–bearing of the beams. As a result of the major span of the ceiling beams, the builder of the facility designed an impressive structural system running along the center of the beams' span, perpendicular to their length.

67. Church of St. Andrew the Apostle in Brwilno Górne. Visible sagging of the nave ceiling.
68. Church of St. Andrew the Apostle in Brwilno Górne. The frame–grid of the roof structure.

This structure is supported by the gable walls and not only serves the role of a central truss from which the ceiling beams hang, but also that of a member longitudinally stiffening the roof structure and the facility as a whole. The discussed frame–grid was tied to the beams using timber braces through dovetail joints. During the reconstruction of the spire in 1846, or some subsequent renovation work, the lower chord of the frame–grid was cut without any forethought completely depriving it of rigidity. The result of this was the significant bending of the entire structure in this area. In the eastern section, action was taken to "draw up" the excessively deformed ceiling beams to match the remaining fragment of the frame–grid in the eastern section by connecting them using chains. However, this operation gave opposite effects to those desired.
At the present moment the state of the structure of the spire is poor. Most of the posts and cross bracing members are strongly affected by insects and fungus. The post on the southern side demonstrates a loss in cross–section caused by *Poria vaporaria* fungus up to 70%–80%. The structure of the spire requires total dismantling as quickly as possible as it is a source of infection for remaining healthy members.

69. Church of St. Andrew the Apostle in Brwilno Górne.
Visible "drawing up" of the ceiling beams to the frame–grid using chains.

The state of the roof structure varies. There are local points attacked by biological corrosion where leaks had existed previously. Most of the members of the roof structure over the nave were executed carefully and are in relatively good technical conditions. They should be specially protected in their original state as a unique historical monument of the art of engineering and carpentry. After the repair of the damaged lower cord as well as impregnation operations, the unique frame–grid structure should also be preserved. The technical condition of the roof structure over the chancel as well as over the western porch is decidedly different in its whole. The rafters near the ridge were joined extremely carelessly, where some were not even joined with the remaining part of the roof structure. What is recommended is the replacement of all four corner rafters, both from the eastern side and the western sides.
The technical state of the boarding as well as the galvanized steel sheet roofing may be evaluated as good. Apart from the point of connection with the spire roof, no traces of leaks have been found in the roofing.
The roof structure of the western porch requires a separate discussion. It was made of poor quality materials by an unskilled carpenter. Due to confirmed numerous insect exit holes, the total replacement of the roof structure in this area is recommended. For reasons of lack of access, it is impossible to evaluate the sate of the structure of the southern porch as well as of the sacristy.
In summary: The commencement of any work whatsoever in connection with the conservation of the polychrome work inside the church requires the prior replacement of all sole plates after the reinforcement of the walls and the entire structure of the church building. It is necessary to assess the stability of the western nave wall following the removal of the cladding, the dismantling of the spire, the repair of the frame–grid, and its joining with the ceiling beams. After performing the reinforcement and impregnation of the ceiling beams as well as of the roof structure, what is recommended is the execution from the top of a doubling of boarding using 25 mm boards attached by slats to the side edges of the ceiling beams. The existing boarding of the ceiling should be suspended from the above described new boarding layer using special screws. The new floor should receive thermal insulation.

4. State of Church Furnishings

4.1. The Main Altar of the Blessed Mother of Mazovia

The main altar was moved around 1740 from the church of the Norbertine nuns in Płock following the liquidation of that order. In 1931 the statue of the Blessed Mother on that alter was replaced by a figure of the Sacred Heart of Jesus funded by Adam Lipka. The original state was reintroduced following World War II at some time between 1959 and 1975. Material: Wood, polychrome, gilded. Style: Late Renaissance. Time of creation: First half of the 17th century. Dimensions: height – 550 cm, width – 350 cm.

The alter is of the wall type, architectural, two level, tri–axial, with four pairs of columns, with a figure of the Blessed Mother of Mazovia in the central field of the first level and a painting depicting the Coronation of the Blessed Mother on the second level. Both levels are designed similarly.

Sculpture of the Blessed Mother of Mazovia – Material: Wood, polychrome, gilded. Style: Renaissance. Time of creation: End of the 16th century. Dimensions: Height – 100 cm.

The altar sculpture is hollowed in the back. It is a Madonna standing erect with long hair and the Infant and a scepter in the left hand. The figure is dressed in a long robe with rhythmic vertical folds expanding downwards with a cloak pinned on the bust with triangular folds. There is a kerchief on the Madonna's head.

The Infant is sitting as if on a throne with the right hand raised as in a gesture of blessing while holding an apple in the left hand. The Infant's dress is a long robe gathered at the waist and decorated with plant motifs. The folds of robe cover the body loosely to become stiffer and tube–like in their lower sections. The robes are gilded while the complexion is flesh–like. Iconography: Apocalyptic Madonna of the type referred to as "Mazovian."

The extreme axes of the altar are limited by columns and contain niches with sculptures—the first level contains an unknown saint and Saint John, while the second level contains St. Stanislaus Szczepankowski and St. Norbert (or St. Augustine).

Sculpture of the unknown saint – Material: Wood, polychrome, gilded. Style: Late Renaissance. Time of creation: Beginning of the 17th century. Dimensions: Height – 100 cm.

The sculpture is hollowed from behind and is placed in a concha niche in the altar. The figure is standing, bear–footed, with a closed book in the left hand while the right arm is bent at the elbow with the palm open (perhaps some attribute was located there originally). The eyes are directed leftwards, towards the center of the altar. The face is expressive with a thick beard and long curly hair. The garment is a long robe with rhythmic, vertical tube–like folds and a cloak pinned around the neck, hanging over the chest. The cloak is arranged in triangular folds that loosely cover the body. Its form is metallic and stiff. The absence of attributes makes identification of the saint impossible.

Sculpture of Saint John the Evangelist – Material: Wood, polychrome, gilded. Style: Late Renaissance. Time of creation: Beginning of the 17th century. Dimensions: Height – 100 cm.

The altar sculpture is hollowed in the back and is located in the altar in a concha niche. The figure is standing and holding an open book in both hands (with fingers extended). The eyes are aimed towards the right in the direction of the altar center. The hair is long and curly. The garment is a long robe with rhythmic tube–like vertical folds decorated with a plant motif and is covered by a cloak pinned on the chest with triangular folds. The robe covers the body evenly. An eagle with its neck extended rightwards and with a bent silhouette is at the feet of the saint.

The predella is decorated using strip plant ornament. At one–third of their height, the little columns are linked by a band below which the ornaments consist of fittings with sequins, rosettes, and winged putti heads with lengthened faces and locks of hair on the foreheads. Above the column band is a strip vine motif. The same is true of sections of the frieze.

The altar lintels have fitting motifs with volutes in their lower sections, a festoon in the center and a putto head on a kerchief above it. Material: Wood. Style: Late Renaissance. Time of creation: Mid–17th century. Dimensions: Height – 100 cm.

The central part of the second altar level contains a painting of the Coronation of the Holy Virgin Mary. Material: Wooden board, tempera. Style: Late Renaissance. Time of creation: Beginning of the 17th century. Dimensions: Height – 40 cm, width – 60 cm.

The painting is rectangular with an arched top. The composition is axial, with three figures; the picture is of a presentational character. The figures are shown from their knees upwards against a background of clouds in robes with minimal folds adhering to the bodies, with coarse facial features. The Holy Virgin Mary is located centrally in a long robe and cloak with hands crossed over the breasts. On the sides is God the Father and Christ holding a crown over the head of Mary. Above is the Holy Spirit in the form of a Dove. God the Father has long robes collected at the waist. Christ is wearing a perisonium and a cloak. Colors: Red, brown, yellow, and white.

The second level of that altar is flanked by sculptures of stains—St. Stanislaus Szczpanowski and St. Norbert (of St. Augustine). Material: Wood, polychrome, gilded. Style: Late Renaissance. Time of creation: Beginning of the 17th century. Dimensions: Height – 50 cm.

The sculptures are located in the crown of the main altar in concha niches. The forms are static, standing erect. The right arms gesture blessing while the left have closed hands (perhaps originally holding crosiers). The saints are dressed in bishop's robes (damatica, a vestment pinned at the breast), with tiaras on their heads. The garments are subdivided vertically by calm, rhythmic folds. The figure of Piotrowin at the feet of St. Stanislaus is emerging from a coffin with crossed hands and a bony face directed towards the saint. White garments, flesh tones, with gilded tiaras and vestments.
The tabernacle is built into the predella. The bottom of the mensa has an ogee shape. The altar is white with gilded ornaments.



70. Church of St. Andrew the Apostle in Brwilno Górne. Main altar of the Blessed Mother of Mazovia, overall view.
71. Church of St. Andrew the Apostle in Brwilno Górne. Main altar, sculpture of the Blessed Mother of Mazovia.
72. Church of St. Andrew the Apostle in Brwilno Górne. Main altar, sculpture of an unknown saint.


73. Church of St. Andrew the Apostle in Brwilno Górne. Main altar, sculpture of Saint John the Evangelist.
74. Church of St. Andrew the Apostle in Brwilno Górne. Main altar, lower level lintel.

4.2. Side Altar of St. Andrew

This altar was purchased during construction of the church from the Franciscan church in Dobrzyn on the Vistula. Material: Wood, polychrome, gilded. Style: Early Baroque in character. Time of creation: Second half of the 17th century. Dimensions: Height – 50 cm, width – 200 cm.
A wall altar, architectural, two story, single axis, with two columns supported on bases, with a painting of St. Andrew in the central field. Ornaments have fleshy forms.

Painting of St. Andrew – Material: Wooden board, tempera. Style: Renaissance. Time of creation: 16th/17th century. Dimensions: Height – 110 cm, width – 140 cm.
The painting is rectangular with an axial composition. The saint, depicted as the central figure, is holding a diagonal cross with both hands, defining the diagonal directions. He is dressed in a long robe and cloak, is barefoot, and has a flaming crown on his head. In further planes there are many tiny figures depicting martyrological scenes from the life of St. Andrew against a landscape background. To the left are riders in helmets and armor riding towards a hill with a diagonal cross—the attribute of the saint. To the right are kneeling and standing figures—naked, in armor and helmets, and the silhouette of a rider. The sky grows lighter towards the horizon. The main colors are blue, red, and brown.
The antependium (altar frontal) bears a painting of Christ in the Grave, flanked by jamb posts composed of auricular motifs, where the painting in the center field is in a frame decorated by palmettes and auricular ornaments intertwining to form a keystone and rosette.
The retabulum is held between two columns with capitals of the composite order, above them is a reduced entablature breaking out over the columns with sequins.

The finial with a newer painting of St. Andrew terminates in a volute peak with corrugated auricular ornaments and cones.

The antependium has a painting—The Angelic Pieta. Material: canvas, oil. Style: Baroque. Time of creation: Beginning of the 18th century. Dimensions: Height – 40 cm, width – 160 cm.
The painting is an extended horizontal rectangle. The central sections is occupied by the figure of Christ semi–reclining on a sarcophagus, naked, in a perisonium. The hands are laid along the body, legs are joined, slightly bent at the knees, the head is raised and surrounded by a halo of rays, the eyes are closed. Angels standing in Mannerist poses are located on both sides. They are dressed in long robes and hold lit candles in their hands. The color of the background is dark blue, the figures have a flesh tone, the halos are golden.
The post jambs are decorated with auricular ornaments with cones in the central part tied together in the middle in the form of a fleshy belt terminating in a volute on the top and bottom. The altarpiece is supported on the mensa growing wider as it approaches the altar box. The altar is white with gilded ornaments.

75. Church of St. Andrew the Apostle in Brwilno Górne. Side altar of St. Andrew, fragment.

76. Church of St. Andrew the Apostle in Brwilno Górne. Side altar of St. Andrew, crown.

77. Church of St. Andrew the Apostle in Brwilno Górne.
Side altar of St. Andrew, antependium.

78. Church of St. Andrew the Apostle in Brwilno Górne.
Side altar of St. Andrew, post jamb ornament.

4.3. Side Altar of the Holy Virgin Mary

Originally the altar of St. Anne, funded by the "peregrina" Sadowska immediately following the building of the church. The founder is buried near the altar. The central part contains a painting devoted to its patron saint. In 1930 the painting of St. Anne was replaced by the Rosary Society for one of the Blessed Mother of the Rosary.
Material: Wood, polychrome, gilded. Style: Late Baroque. Time of creation: Mid–18th century. Dimensions: Height – 500 cm, width – 300 cm.
Wall altar, architectural, two story, single axis, with two columns supported on bases terminating the predella. Containing a painting of the Holy Virgin Mary with the Infant in the center field.

The retabulum is contained by a pair of columns on plinths breaking out of their bases, decorated by a strip of plant–like pincer ornament. The columns have capitals of a composite character. The retabulum is terminated by an entablature breaking out over the columns with acanthus rosettes in the frieze section. The central painting is in a frame terminated by a concave–convex arch with a break, flanked by two sets of campanulated ornaments springing from shells.

The finial contains a painting of St. Teresa surrounded by flowing volutes with plant motifs and clouds.
The lower level of the altar is flanked on the left by a sculpture of St. John the Baptist. Material: Wood, polychrome. Style: Baroque. Time of creation: Mid–18th century. Dimensions: Height – 100 cm.
The sculpture is solid. It is a figure standing on a plinth, bent in an *S*–like shape, dressed in a camel skin. The right leg is slightly bent, the arms are spread apart, the hands open, the head turned downwards with a beard and long, wavy hair falling on the shoulders, acute features.

The saint is dressed in a skin that hangs over the right shoulder and is tied at the waist, as well as a cloak. The camel skin extends to the knees, the cloak is longer. The skin tone is that of flesh, the garment is gilded.

To the right, the lower level of the altar is flanked by a sculpture of St. Paul. Material: Wood, polychrome. Style: Baroque. Time of creation: Mid–18th century. Dimensions: Height – 100 cm.
The sculpture is solid. It is a figure standing on a plinth, bent in an *S*–like shape, barefoot, with the right leg slightly bent, the right arm extended, the hand open, with an open book in the left. The bearded face has acute features, and the balding forehead has single curls of hair. The robe is long with rhythmic lancet–like folds and is tied at the waist. The shoulders are covered by a cloak with a hood that is tied with a knot at the chest, the edges are ornamented. The skin tone is that of flesh, gilding.

79. Church of St. Andrew the Apostle in Brwilno Górne. Side altar of the Holy Virgin Mary, overall view.
80. Church of St. Andrew the Apostle in Brwilno Górne. Side altar of the Holy Virgin Mary, sculpture of St. John the Baptist.
81. Church of St. Andrew the Apostle in Brwilno Górne. Side altar of the Holy Virgin Mary, final.

82. Church of St. Andrew the Apostle in Brwilno Górne. Side altar of the Holy Virgin Mary, sculpture of St. Paul.

83. Church of St. Andrew the Apostle in Brwilno Górne. Side altar of the Holy Virgin Mary, sculptures of angels in the final.

84. Church of St. Andrew the Apostle in Brwilno Górne. Side altar of the Holy Virgin Mary, antependium.

85. Church of St. Andrew the Apostle in Brwilno Górne. Side altar of the Holy Virgin Mary, mensa.

The finial is flanked by sculptures of angels.
The antependium has a painting of an unknown saint. Material: Wood, oil. Style: Baroque. Time of creation: First half of the 18th century.
Dimensions: Width – 100 cm.
The antependium is in the form of an extended molded board, framed by a strip–like motif with acanthus elements. Inside, there is a painting depicting an unidentified figure kneeling before a cross in the central part. The background is an urban landscape. The forms are developed schematically. The painting is signed on the right, but the signature is illegible. Color scheme: White, brown, yellow, gray.
The altar is white in color with gilded ornaments.

State of Preservation of the Altars
The original color schemes of the altars are hidden beneath the present layers of white and gilding. The paintings seem to be unchanged in composition and color scheme. Numerous missing fragments. The state of the sculptures is similar. Conservation is vital.

4.4. The Pulpit

Material: Wood, polychrome, gilded. Style: Neoclassical in character. Time of creation: End of the 17th century. Dimensions: Height – 380 cm.
A hanging wall pulpit with a four–sided body, closed from the bottom by a four–sided bowl with ribs marking the edges. Above the bowl, separated by a band of molding serving as their base, are consoles supporting the columns on the edges of the body. The columns have a bulge , are located on bases, and have composite capitals. The body is terminated by an entablature, breaking out above the columns, where the frieze section has rosettes.
The fields contain oil paintings painted on boards, which depict the Evangelists, with framing closed by an overhanging arch. The Evangelists are presented in upright positions, with long flowing robes, in Mannerist poses, with beards, and books (and an angel behind St. Mathew).

The background panel contains a newer painting—The Good Shepherd. The canopy is six–sided with a suspended ornamental fringe and crowned by a comb–like ornament. The balustrade is solid with posts and a grated opening, decorated on the top and bottom by molding leading from the base and crown of the body. Color scheme – Pulpit: White and gold. Paintings: Red and blue.
Conservation is vital.


86. Church of St. Andrew the Apostle in Brwilno Górne. Pulpit, overall view.
87. Church of St. Andrew the Apostle in Brwilno Górne. Pulpit, The Good Shepherd on the background panel, and a canopy.



88. Church of St. Andrew the Apostle in Brwilno Górne. Pulpit, a panel of the balustrade depicting one of the Evangelists.
89. Church of St. Andrew the Apostle in Brwilno Górne. Pulpit, a panel of the balustrade depicting one of the Evangelists.
90. Church of St. Andrew the Apostle in Brwilno Górne. Pulpit, a panel of the balustrade depicting one of the Evangelists.

4.5. The Crucifix on the Rood Beam

Material: Polychrome, wood. Style: Late Gothic. Time of creation: 16th century. Dimensions: Height–100 cm.
Christ is nailed to the cross using three nails, with the sign "INRI" over his head. The body is emaciated, straight, with arms outstretched, the head slightly bent to the right, the eyes closed, and the legs straight. The perisonium is smoothly hung, intertwined in the front. One of the ends is wrapped between the legs to turn up on the back side to the right. The crown of thorns is developed as a plane. Anatomical detail is general in nature.
Conservation is vital.

91. Church of St. Andrew the Apostle in Brwilno Górne. Crucifix on the rood beam.
92. Church of St. Andrew the Apostle in Brwilno Górne. Crucifix on the rood beam.

4.6. Pews

Material: Painted wood. Style: Neo–Baroque in character. Time of creation: End of the 19th century. Dimensions: Height – 50 cm, width – 150 cm, length – 220 cm.
The pews consist of three segments, each with a rectangular frame of thick boards. The sides are treated with scroll work. The head and back are without decoration. The color is brown. Individual elements use tenon joints. The lower sections of the side walls are reinforced with braces.

4.7. Crucifix: The Southern Porch

Material: Polychrome, wood. Style: Baroque. Time of creation: 18th century. Dimensions: Height – 60 cm.
Christ nailed to a cross using three nails, the body is straight with an exaggerated slump and compact structure. The head is slightly bent to the right. The eyes are closed, mouth partially open, legs straight. The body proportions are shortened. The perisonium is tied with a rope, open on the right side, loosely stretched on the left hip. Christ is presented as being dead.
Conservation is vital.

93. Church of St. Andrew the Apostle in Brwilno Górne.
Crucifix from the southern porch and stoup.

4.8. Crucifix: The Western Porch

Material: Wood, polychrome. Style: Baroque. Time of creation: End of the 17th century. Dimensions: Height – 80 cm. Christ nailed to the cross using three nails. Exaggerated slump. Body extended, straight. The head is bent towards the right breast, eyes are closed, legs slightly bent. The body proportions are exaggerated. The perisonium is a strip tied in a knot, tied with a rope. Christ is presented as being dead.
Conservation is vital.

4.9. Baptismal Font

Material: Wood, polychrome, gilded. Style: Neo–Baroque in character. Time of creation: End of the 19th century. Dimensions: Height – 160 cm.
The baptismal font is of the chalice type. The base is a molded plinth on a quarter bead. The shank is of the baluster type, single–belly, on four scrolled brackets, with fluted edges, with an overhanging oval form at the point of joining of the brackets, terminated by a half–belly. The bowl is curled, held by a wreath of lancet–like forms on the bottom, terminated with molding. The cover's edges have an ornamental palmette molding. The cover is terminated by a post, decorated in its lower section by palmettes. The post is supported by four ogees. The color scheme is white and gold.
Conservation is vital.

94. Church of St. Andrew the Apostle in Brwilno Górne. Baptismal font.

4.10. Chandelier

Material: Bronze. Style: Late Baroque. Time of creation: Second half of the 19th century. The chandelier is based on a molded core with a sphere in the center. Eight bent ogee arms spread out from the sphere to the decorative candle holders. The arms and core are decorated by latticework in the form of dots and scrolls.

4.11. Stoup: Southern Porch

Material: Carved granite. Style: No stylistic qualities. Time of creation: 16th century (?). Dimensions: Height – 70 cm, width – 50 cm.
The stoup is oval in shape with oblong edges. The upper surface has a carved bowl for holy water with circular edges and the bowl itself is in the form of a section of a sphere. The exterior form is rough finished.
Conservation is vital.

4.12. Epitaph Plaque of Father Stanisław Kobyliński

Material: Marble. Style: Contemporary art. Time of creation: Second half of the 20th century. Dimensions: Height – 54 cm, width – 41 cm.
This item is to the right of the entrance from the southern porch. The rectangular plaque is made of white marble, decorated by large metal pyramids in the corners.
Text: "Ś. + P. / KS. STANISŁAW / KOBYLIŃSKI / PROBOSZCZ PARAFII BRWILNO / UR. 13 STYCZNIA 1894 R. / ZGINĄŁ ŚMIERCIĄ MĘCZEŃSKĄ / Z RĄK HITLEROWCÓW / ZA KOŚCIÓŁ I POLSKĘ / PAMIĄTKĘ TĘ UFUNDOWALI / PROSZĄC O MODLITWĘ ZA JEGO DUSZĘ / PARAFIANIE BRWILEŃSCY [R.I.P. / Father Stanisław / Kobyliński / Rector of the Brwilno Parish / Born January 13, 1894 / Died a martyrs death / By the hand of the Nazis / For the Church and Poland / This memento was funded / With a request for prayer for his soul / By the parishioners of Brwilno].

95. Church of St. Andrew the Apostle in Brwilno Górne. Epitaph plaque of Father Stanisław Kobyliński.

4.13. Eternal Light

Material: Brass cast. Style: Neo–Baroque. Time of creation: Mid–19th century.
A three–part lamp, where the central section is in the form of a fat cylinder, with three chain holders. The lower part is reminiscent of a pear, with a ring attached to the bottom. The upper part is in the form of a cylinder. The individual parts are joined by concave surfaces. The holders are applied and decorated with plain cartouches with oval fields.

4.14. Organ

The organ is a seven voice instrument serving as a furnishing of the church from the beginnings of its existence. It is said that this organ was reconstructed from the old organ of the church in Sikorz.

Material: Wood, polychrome. Style: Neo–Baroque. Time of creation: Mid–19th century. Dimensions: 200 cm x 200 cm.
A positive organ, non–uniform, built in line with Baroque traditions, with mechanical stops and a mechanical–piston windchamber with a seven–rank set of sounds with a full tonal C–c^3 range and a multifold bellows.

The organ is located in the timber choir supported on two posts. Built as a positive in the choir baluster, it occupies the entire width of the single–nave church. The front of the swell box is based on Baroque models, with three multisided pipe towers (the central one being the larger), separated by intermediate pipe planes. The bases of the three towers are supported by open consoles made of boards with molded edges. The crowns of the towers are richly molded. The upper covers of the pipe shapes in the towers are solid and decorated by stylized bas–relief ornament. The entire enclosure was repainted white using oil paint, while the molding of the towers is ochre. The principal pipes are made of tin. The interior of the box contains the instrument's components. The register manuals are directly connected to the register pistons in the swell box. The pins linking the keys with the abstracts are on a common block and are made of sheet metal. They are inoperative (the interior is destroyed).

In spite of damage to the organ, the instrument is worthy of the efforts of organmasters–conservators in order to return it to its former technical–musical efficiency. The recommended, necessary work should be commenced with the disassembly of their interior components of the instrument followed by the cleaning of the interior of the organ enclosure and the individual components of the instrument. After analysis of the sate of preservation of the pipes, existing damage should be repaired, while missing pipes reconstructed. Missing panels in the organ enclosure should also be replaced. Replacement of the springs in the interior of the swell box is recommended. Perforations present in the existing bellows should be sealed, gluing on an appropriate type of leather. The surfacing of the keys also requires supplementing. The existing stops need regulations. All wooden elements must be impregnated by effective insecticides. Upon the setting up of all component elements of the instrument in their places, the sound ranks should be tuned.

96. Church of St. Andrew the Apostle in Brwilno Górne. The organ.

4.15. Polychrome

Dating from 1914, author unknown, oil. The polychrome work completely covers the ceiling and walls. Patrimonials on the walls—in the nave with motifs of stylized palmettes and a frieze in the central section, built up of alternating monograms of Mary and Christ. The porch is treated similarly.
A separate composition is made up of two angels forming the background of the main altar.
The ceiling is decorated with a centrally located Apocaliptical Lamb painted in the center and the four Evangelists in the corners.
A medallion is located in the chancel depicting God the Father with the words: "Sanctus, Sanctus."

The whole is framed by plant–like ornaments. The space between presented scenes is filled by entwining plants.
The polychrome work shows no major losses. There are individual cavities and minor losses along the edges of the boards. What is missing with respect to the original solution is a part of the inscription on both sides of the rood beam and the balusters of the choir.
The polychrome work on the walls and ceiling should be cleaned of dust and dirt, missing wood should be replaced, and losses in the work should be subject to spotting.

97. Church of St. Andrew the Apostle in Brwilno Górne. Polychrome work on the walls, the angel on the left side of the main altar.
98. Church of St. Andrew the Apostle in Brwilno Górne. Polychrome work on the walls, the angel on the right side of the main altar.
99. Church of St. Andrew the Apostle in Brwilno Górne. Polychrome work on the ceiling, Apocaliptical Lamb.

100. Church of St. Andrew the Apostle in Brwilno Górne. Polychrome work on the ceiling, one of the Evangelists.

101. Church of St. Andrew the Apostle in Brwilno Górne. Polychrome work on the ceiling, God the Father.

4.16. Inscription Relating to the Church Founding

The year 1749, tempera on wood. Location: Over the door to the sacristy. Wording: "Fundator Hug Ecclesiae: IR MK PP Ano Dni 1740."
Conservation is vital.

102. Church of St. Andrew the Apostle in Brwilno Górne. Inscription relating to the church founding.

4.17. Flooring

Wood, pine, contemporary.

103. Church of St. Andrew the Apostle in Brwilno Górne. Flooring.

5. Identified Threats to the Facility

5.1. Geology

The siting of the church complex on a hill overlooking the Vistula River is, on the one hand, very picturesque and enriches its aesthetic qualities, but on the other hand, it is a threat to the existence of the historical monument. The church lot is located overlooking a deeply incised valley with extremely sloped sides that have a 36°–55° incline. It is through this valley that a nameless stream flows into the Vistula River. A landslide occurred at the end of April of 2002 near the church (approximately 7 m from the chancel); a section of the church land, inclusive of trees, collapsed. Unfortunately, this was not the first time something like this occured. Old archival materials demonstrate that a similar event happened in the same place just before the year 1812.
Due to the slope failure and a very real threat, action was taken immediately. The state of the landslide was assessed and the threat identified.

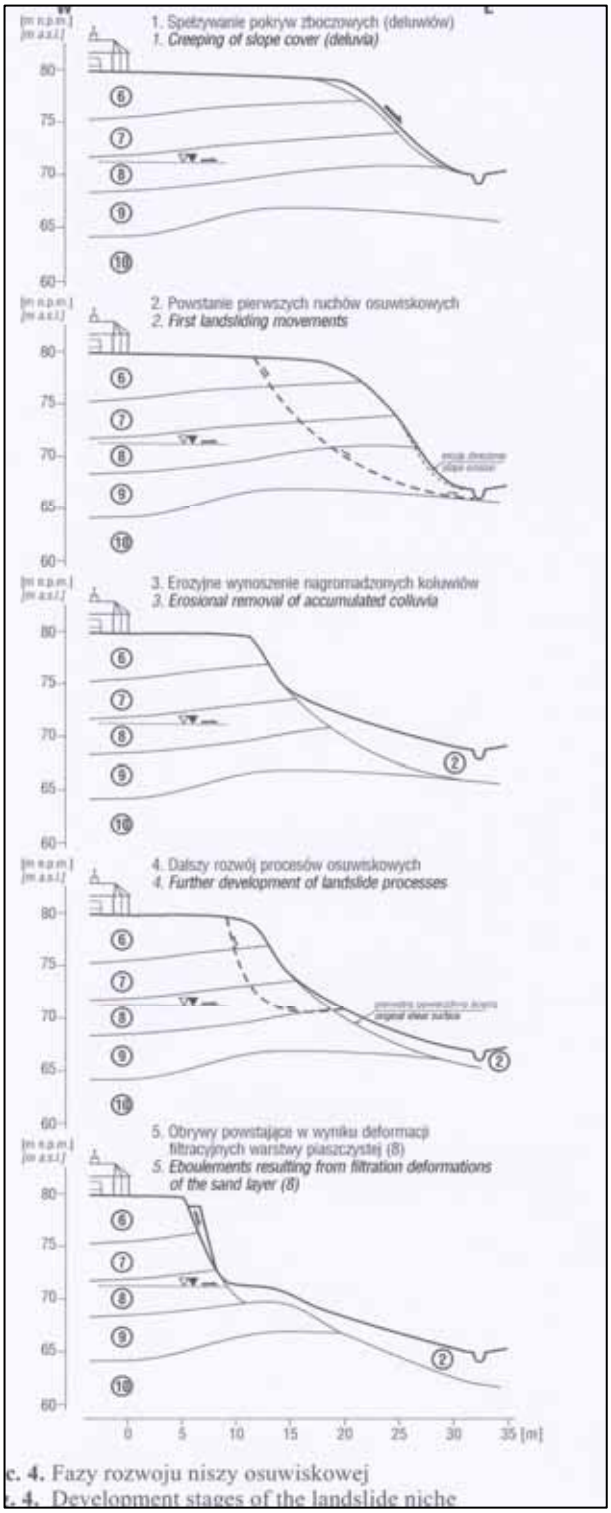
104. Brwilno Górne, church complex, 2002 – the landslide. The wall of the church chancel can be seen to the right. Scan of the landslide.
105. Brwilno Górne, church complex, 2002 – the landslide. Scan of the landslide 2.

Streamlets of water began to flow from the resultant niche wall; these watered the collapsed earth in the tongue of the landslide. Sulfone treatment was applied to the outline of the upper soil layers of the slope to bind the earth. They were conducted by Prof. Zygmunt Glazer, Ph.D., a prominent specialist in the field of hydro–geology who was invited to perform the work. The Professor identified a top layer of initial soil created out of windrow, leveling the lot surface, as well as a layer of morainic clay. When dry and compact, such clay can even hold a vertical section of slope (albeit not too high). Unfortunately, under the influence of water, such a mass softens easily and changes its coherence. A layer of watered sands is found beneath these clays and it is the water flowing from there that is watering the collapsed earth found in the landslide niche. The floor of the sand layer remained hidden. Information procured demonstrated that a process of concentrated ground water flow was occurring in this layer—a process of fluidation. The state of the bank was defined as very dangerous and it was predicted that the ongoing process of softening the clay at the foot of the slope "may result in a significantly greater failure."

A program of temporary and basic ordering of the site and securing works intended to prevent the complete softening of the collapsed soils, and therefore their continued sliding, was developed on the basis of observations and preliminary studies.

First and foremost, the trees that fell into the landslide bowl were cut up and removed, as were all other drifts that might accumulate in the stream bed and result in water stagnation. Temporary ditches were dug in order to capture and direct the streamlets of water into the stream. The purpose of these works was to bring about a drying of the coluvium soils and the temporary stabilization of slope failure processes.

Operations aimed at a more permanent securing of the landslide were conducted in parallel with the safeguarding work. Prof. Zygmunt Glazer specified several solutions in his report. Their selection is to be based on financing procured for this purpose.



c. 4. Fazy rozwoju niszy osuwiskowej
. 4. Development stages of the landslide niche

Phases of development of the landslide niche. "Zagrożenie budowli zabytkowych związane z rozwojem czynnych procesów geodynamicznych na przykładzie kościoła św. Andrzeja w Brwilnie Górnym" [The Church of St. Andrew in Brwilno Górne: Threats to historical buildings in connection with the development of active geo–dynamic processes – A case study] by Andrzej Drągowski, Krzysztof Cabalski, and Michał Radzikiewicz in *Przegląd Geologiczny* [Geological Review], vol. 53, no. 9, 2006, pp. 784–785. Scan of geology 4.

- "The capturing of the waters flowing from the layer of sands applying the principles of a reverse filter, followed by the rebuilding of the bank. In the case of this solution, it is necessary to select a gravel aggregate in line with principles stated by Terzachi or pursuant to United States standards for dams.
- "The building in front of the lot, in the direction of the approach of ground water, of drainage facilities capturing and making impossible the reaching of the bank by the water.
- "The creation in front of the lot of a cut–off wall preventing the flow of water to the bank.
- "Following the performance of site ordering and temporary safeguarding work, the leaving of the bank without any final safeguard, with the awareness that it will become necessary to move the historical church as the slope failure process proceeds."

Documentation was prepared in 2003 that was to serve as a basis for the development of a comprehensive safeguarding and bank rebuilding design for the area of the church—"Geological–Engineering Documentation for Defining Possibilities for Securing and Rebuilding the Escarpment in the Area of the Historical Church of St. Andrew Complete in Brwilno Górne" [in Polish]. It was drafted by a team of specialists—Prof. Andrzej Drągowski, Ph.D., Prof. Zygmunt Glazer, Ph.D., P.E., Krzysztof Cabalski, M.S., and Michał Radzikowski, M.S. This documentation presents the results of geological studies, defines the causes and course of slope failure processes, presents a prognosis regarding further transformations, and identifies directions to be taken in order to secure the church.

It is the view of the authors of the documentation, that the movements of the soil masses in the form of landslides as well as the shifting of the escarpment towards the church is connected with the influence of water from the sandy layers (layer 8) and the filtrational deformation occurring there as well as, to a certain extent, the drying out of clay building the landslide slope. These processes created a coluvia in the landslide niche zone. Long–term watering of the coluvia by water flowing from the sandy layers resulted in the dampening and plastification of these soils. Initially, following the creeping of the deluvian cover safeguarding the bank against the action of external factors, landslides of a circular and cylindrical surface cut type occurred, but it was only after the shaping of the new surface of the landslide base that slope failure occurred. The authors of the documentation present the course of this process in drawings:

It is the view of the authors of the documentation that , in light of conducted calculations, the slope is not threatened by an imbalance of overall stability and the creation of the lid of a spatial landslide with a circular–cylindrical surface of the cut. However, it is assessed that there exists the possibility of the gradual occurrence of slope failures and the shifting of the edge of the landslide and gully in the direction of the church. A direct reason for these processes can be increased atmospheric precipitation with its influence on ground water, thus causing the increased flow of water from the sandy layers, the further dampening of the coluvia, and its movement down the gully. This may significantly change the layout of forces in the area of the bank, including the creation of an unstable state.

In light of the rapidly progressing geo–dynamic processes, it was decided to undertake two phases of the securing works:

- The temporary safeguarding, performed in the autumn of 2003, which guarantied the safe flow of water from the bank of the landslide and made possible its removal to the stream at the bottom of the ravine. As a part of the temporary work, heaps were built up and shaped in the form of a reverse filter safeguarding against tunneling and erosion in the zones of water outflow from the bank, following the removal of coluvia clay. The water from the heaps is removed through ditches laid with needled cloth.
- The ultimate solution should result in the total elimination of water outflow from the bank of the landslide. Design assumptions for the final solutions are ready (see: "Planned Action: Geology"). The final design for the securing of the bank and the church has not yet been developed, however. This is because the execution of these works necessitates significant funding—much greater than the potential of the parish and institutions acting to protect historical structures at their original sites.

Conclusions

- can be deduced from an analysis of geological and engineering conditions, the further development of mass movements (primarily in the form of landslides), directly threatens the historical building—the Church of St. Andrew.
- The scope and zone investigated as well as presented directions for safeguarding work, take into account the qualities of the church as a historical monument as well as its environs. All research work as well as the concept for safeguarding works, were undertaken under the assumption that the church cannot be moved to a different location.
- The direct cause of the landslides occurring on the slope found 7 m away from the church wall, is the zonal influence of water outflow from an approximately 3 m layer of sands found between dumped clay and a layer of varved clay, uncovered at the foot of the landslide slope.
- The water flowing out of the sandy soils is causing filtrational deformation (the plastification and washing away of soils), which results in the shifting of dry soil lying above.
- Comprehensive environmental analysis based on studies and calculations has made possible the defining of temporary safeguarding operations on the slope as well as a final solution for building up the niche of the landslide, thus securing the church.
- The state of danger facing the church is great. The shifting of the upper edge of the landslide—dependent on seasonal hydro–dynamic fluctuations—may demonstrate significant dynamics.
- The concept for a final solution, which assumes the use of reinforced soils, requires the regulation of water removal from the landslide zone through drainage of the base of the landslide or the execution of absorption wells between the two water–bearinbg layers.
- In the case of studies of historical buildings adjacent to escarpments, it is important to conduct detailed observations and registration of initial deformation preceding erosion processes and mass movements. However, in designing safeguards, it is recommended that the methods used be as noninvasive as possible and be conducted in phases in combination with appropriate monitoring.

5.2. Water Drainage System

The atmospheric precipitation and ground water drainage system is of prime significance to the state of preservation of structural lumber. In the case of the church in Brwilno, the discussed problem has an additional aspect: the system should be designed and implemented so precipitation is led away from the crown of the embankment, which continues to be threatened by slope failure processes. The existing system is not functioning in an effective manner and its concentration of flows in linear and point form is causing a state of hazard for the structural members of the walls. The situation should be remedied immediately. The church land should be landscaped and the water should be directed towards the road or northwards to an absorbing well. The implementing of drainage in the eastern section of the church land should be considered.

5.3. State of the Building Substance and Structure

The need for reinforcing parts of the church foundations is very probable. Their state at this time was not evaluated due to lack of access. However, as a result of many years of improper precipitation removal they might be weakened.

The load–bearing walls of the church—insufficiently assessed due to cladding covering them from the outside—require reinforcement and conservation. This is especially true of the walls of the northeast corner near the chancel as well as the western wall of the nave.

The roof of the facility required immediate action, especially the spire. Its technical state is so poor so as to threaten failure and collapse into the church interior. Moreover, it is necessary to quickly reinforce the frame–grid structure of the roof and ceiling.

The church should receive thermal insulation as the thermal insulating properties of the walls and ceiling are insufficient. The installation of thermal insulation should be conducted in a manner so as not to interfere with historical qualities—beneath the cladding of the exterior walls and above the ceiling.

Biological Corrosion

Biological corrosion is connected with processes destroying wood that are caused by the action of insects, wood damaging technical agents, dampness, and fungi.

In the case of the church in Brwilno, biological corrosion is the reason behind the almost the total destruction of the sole plate and the rather significant weakening of the ceiling structure and its boarding. A significant portion of the ceiling beams shows signs of biological corrosion, primarily caused by the feeding of pests. In the case of the timber structure of the tower and spire, most of the posts and bracing members are strongly affected by insects and fungi. It is for this reason that damage to the posts has even reached 80%. The biologically affected structure of the spire is a source of infection for the remaining healthy members of the roof structure and it should be designated for dismantling immediately. As to the other members of the roof structure, they also shows focused points of attack by biological corrosion factors. The load–bearing walls of the church are insufficiently assessed due to the presence of exterior cladding. More information regarding biological corrosion may be found in the chapter describing the church's technical state.

There are many efficient and non–destructive methods for preventing biological corrosion and the conservation of wood that is already damaged. Selection should be conducted following mycological investigation and the establishing of a program of conservation work.

Roofing

The watertight sheet metal roofing bring with it two dangers: A lack of ventilation of the roof structure and significant diurnal temperature fluctuation in the attic space. These conditions are extremely unfavorable for the state of preservation of the timber structural members of the roof. A return to the initial shingle roofing is recommended; it guaranties optimum conditions for preserving the roof structure while simultaneously improving the aesthetic qualities of the church. It should be stressed that access to the church attic space is difficult; this makes it impossible to periodically check the water–tightness of the roofing and the state of preservation of structural members. A new accessway to the roof structure may be made from the choir *empore*.

5.4. Fires

Fire is the greatest threat to timber churches, including the church in Brwilno Górne. Fire brings about total destruction and may be the result of faulty electrical systems, atmospheric discharge, and arson. The character of such destruction is definitive and final. A dozen or so minutes suffices for fire to envelope the entire wooden building. Such a period of time is too short for the arrival of the Fire Department. It is for this reason that one of the most significant elements of effective fire protection is prevention—prevention by way of inspections of the electrical system, lightning protection system, and the securing the wood with special fire–protection preparations. What is important is the introduction of systems and technical solutions that engage automatically in the event of hazard and prevent the spreading of the fire until at least the moment of the arrival of the Fire Department (e.g. fire extinguishing systems using water mist, which have as of yet not been tested in facilities with polychrome work and valuable furnishings).

5.5. Burglary

The theft of valuable interior furnishings, often undertaken "on special order" for concrete buyers who are extremely knowledgeable in the resources of the facility, is often additionally tied with arson intended to destroy evidence of burglary. The church in Brwilno Górne has many items that might be the reason behind a break–in. Recently, sculptures (especially angels), fragments of altar ornaments as well as paintings are a lure for thieves. All too often, the recovery of stolen works of art is not possible. As a preventive measure, the church in Brwilno Górne has recently been equipped in an alarm system and 24–hour monitoring.

5.6. Threats Posed by Improper Methods and the Use of Improper Materials for Conservation Work as a Result of a Lack of Awareness or Skill on the Part of Persons Conducting Conservation and Renewal Operations

Wood, like no other material, registers marks of the passage of time. Some even seemingly unimportant building members are of significance—they are witnesses to events that occurred at the given place. Such minor elements as worn thresholds, doors with marks of many years of usage, and cladding or cornice boards sculptured by rain and grayed by the sun all work to maintain the specific climate of an old church. Bearing this in mind, any repair, conservation, or revitalization work, in line with basic conservation principles, should strive to respect the original historical substance as well as all its values to the greatest extent possible. Interference should be kept to an absolute minimum, while efforts should be made to reinstate the technical efficiency of structural systems as well as the architectural decor of the building to the greatest extent possible. These guidelines are in agreement with international "Principles for the Preservation of Historic Timber Structures," a document ratified by the General Assembly of the International Council on Monuments and Sites (ICOMOS) in Mexico in 1999: All intervention should be "with due respect for the aesthetic and historical values, and the physical integrity of the historic structure or site." During work "all material, including […] in–fill panels, weather–boarding, roofs, floors […] should be given equal attention" as in the case of the building structure.
The above comment pertains to planned action and is the result of a desire to evade an error so very common in similar situations: the tendency for the unthinking and mass replacement of the original part were buildings that are deemed improper and modest are provided with new elements, thus simultaneously lowering the value of the facility as a whole. It is of great importance that the difficult and complex conservation and revitalization tasks in the building be assigned to a specialized design team and a reliable contractor with experience in this field.

5.7. Potential for Degradation of the Cultural Landscape

Degradation of the historical structure and its exposure may occur through new discordant structures as well as existing and newly introduced technical infrastructure such as overhead electrical lines, cellular telephone antennas, etc. Unappealing is equipment, systems, and electrical connections, or even their fragments, installed directly on the walls of the facility, both inside and out. This is also a problem facing the church in Brwilno Górne: the indoor electrical system is conducted over the polychrome covered walls of the church, an ugly lantern hangs bear the main entrance, and the electrical line is brought up to the church's front facade as an overhead line. There is the threat that the land surrounding the church may be improperly designated for high–density housing or, even worse, retail or industrial functions.

6. Planned Actions in Order of Immediacy

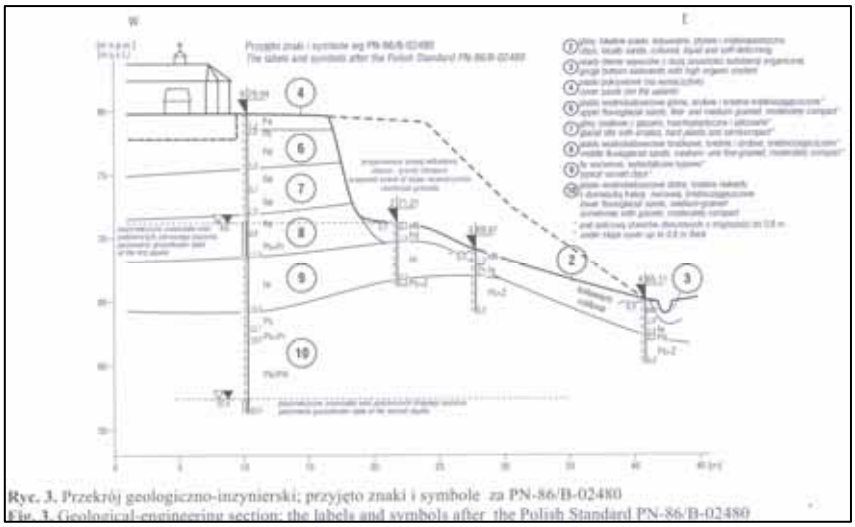
6.1. The Need for Additional Surveyed Measurements and Their Scope

- Detailed surveyed inventory drawings as well as photographic documentation of the original church roof structure, inclusive of woodworked joints and carpenter's marks, should be developed.
- Surveyed inventory drawings should be made of the state of the church wall structure during renovations work, following the removal of cladding.
- Mycological studies of the whole church should be conducted.
- It is absolutely vital that surveyed inventory drawings as well as photographic documentation be prepared of the bell tower, inclusive of all joints.
- A very pressing need is the conducting of surveyed inventory drawings and photographic documentation of the tomb. It is so damaged that from year to year losses in its stucco ornaments are becoming significantly greater. Such an inventory may prove the only documentation that will allow for the recreation of the decor and the conducting of comprehensive revitalization work in the future.
- Archeological and dendrological studies should be conducted in order to clarify as yet unanswered questions regarding the original architectural form of the church, especially its entire western part.

6.2. The Question of the Building's Foundations

Questions regarding the geology and hydrology of the land immediately surrounding the church complex were discussed in previous chapters. Temporary work and the temporary securing of the landslide located in the vicinity of the church have been performed and they perform their tasks. However, the most difficult task remains—

the development of a design and the execution of ultimate safeguards. The final solutions, whose assumptions were developed by the team of Prof. Zygmunt Glazer, Ph.D., P.E., Krzysztof Cabalski, M.S., and Michał Radzikowski, M.S., should result in the complete elimination of water outflow from the landscape slope and the elimination of threats to the existing church complex in its original location. Conducted studies show that there is a possibility of dumping water from the first water–bearing layer into the second through an absorption well. Overall, environmental conditions for this concept are favorable: The chemical makeup of the waters of both layers are similar and the water table of the lower layer is significantly lower than the floor of the upper water–bearing layer. Apart from drainage openings in the outflow zone of the sandy layer, a landslide niche should be built and drains installed removing the water from the landslide zone. The team of experts proposed the building of a niche by using reinforced soils. The application of this solution in the examined case will be possible after the regulations of water relations in the area of the slope.



Ryc. 3. Przekrój geologiczno-inżynierski; przyjęto znaki i symbole za PN-86/B-02480
Fig. 3. Geological-engineering section; the labels and symbols after the Polish Standard PN-86/B-02480

Geological–engineering cross–section. Symbols and labels used as in Polish standard PN–86/B–02480. Drawing from the "Zagrożenie budowli zabytkowych związane z rozwojem czynnych procesów geodynamicznych na przykładzie kościoła św. Andrzeja w Brwilnie Górnym" [The Church of St. Andrew in Brwilno Górne: Threats to historical buildings in connection with the development of active geo–dynamic processes – A case study] by Andrzej Drągowski, Krzysztof Cabalski, and Michał Radzikiewicz in *Przegląd Geologiczny* [Geological Review], vol. 53, no. 9, 2006, pp. 784–785. Scan of geology 3.

The diagram above presents the essence of the solution subject to defined conditions of landforms (geometry) and the shape of the masses making up the slope. In the developed concept for securing the church, a method involving the reinforcement of soil using an appropriately selected plastic net and the setting up of gabions will be applied following macro–levelling of the base. The whole will ultimately be covered by geo–netting for planting and thus securing the landscaped slope against erosion.
The design for the ultimate safeguarding of the slope and church has not yet been developed because the execution of such works necessitates significant funds, significantly out of the reach of the parish and institutions striving to preserve historical structures in their original locations.

6.3. The Question of the Building's Substance and Structure

- The most pressing intervention in the area of the church complex is the disassembly of the *spire* on the roof of the church. Currently, the state of the timber structure of the spire is so bad as to be a source of biological infection for the remaining healthy members of the roof structure and it may collapse into the church at any time.
- Moreover, it is also necessary to reinforce the frame–grid system of the *roof structure* as well as the ceiling structure of the nave immediately.
- It is very probable that it will be necessary to reinforce a part of the church *foundations*. Their state at the present moment has not been evaluated due to lack of access. However, as a result of years of improper removal of precipitation, they may be weakened. The church sole plate may be due for replacement to a great extent.
- The *load–bearing walls* of the church—insufficiently evaluated due to the cladding covering them from the outside—require reinforcement and conservation, especially in the area of the northeast corner near the chancel and the western wall of the nave.
- The church should be provided with thermal insulation. The *thermal properties* of the walls and ceiling are unsatisfactory. Insulation should be provided using methods that do not interfere with the historical qualities of the church—beneath the cladding of the exterior walls and on top of the ceiling.
- The *cladding* is due for conservation involving the removal of secondary oil paint coatings, impregnation, and a return to the original brick–red color scheme.
- The original *shingle roofing* should be reinstalled so as to provide for better conditions for preserving the roof structure while simultaneously improving the aesthetic qualities of the church. A new accessway should also be built leading from the choir *empore* to the roof structure, thus facilitating necessary periodic inspections of the water–tightness of the roofing and the state of preservation of roof structure members.

- *Window and door frame woodwork* is to be preserved following its conservation involving the removal of secondary oil paint coatings and a return to the original color scheme, as well as the preservation of the historical glass.
- The existing historical *hinges, locks, bolts and chains* are to be preserved following conservation (the removal of secondary paint and securing against corrosion).
- The *contemporary floor*, following removal of pain coatings, should have its surface secured by tinted, abrasion resistant matte impregnates.

The above scope of work should be encompassed by a professional church conservation and revitalization design developed by a designer with experience in designs of similar character.

6.4. The Need for Electrical System Work: Electricity, Lightning Protection, Fire Protection, Alarms

Electrical system of the church in Brwilno Górne – Requires design and execution, hiding it in a manner so as to not interfere with the historical interior.
Lightning protection system – Requires continuous monitoring and running maintenance.
Alarm system – As above.
Fire–emergency system – Requires installation. The system should be of a type and with technical solutions that, in the event of threat are actuated automatically and prevent the spreading of fire for a time at least up to the arrival of the Fire Department. The system should be installed in a manner that does not interfere with the aesthetics of the facility.

6.5. Actions Relating to the Historical Furnishings of the Church and Its Surroundings

All historical elements of the *church's furnishings*, discussed in a separate chapter, require conservation and revitalization in line with separately prepared work programs. The rood beam, an architectural elements that is also tied with the interior decor of the church, also requires revitalization in line with a separate work program.
The original *fencing* of the church complex was made of wood. Initially of planks, later of horizontal logs, and then of pickets. As of the nineteen–seventies the church's fencing is of metal. In spite of the fact that such fencing undoubtedly satisfies the tastes and expectations of the parishioners, for conservation reasons, the old type of fence—timber logs laid horizontally—should be restored. Such a solution would be in agreement with the climate of the historical church complex as well as the historical message.

6.6. Water Removal

The improvement of the water removal system for precipitation and ground water should be a priority. The land surrounding the church should be shaped and the water should be directed towards the road or to the north to the absorptive well. The installation of drainage should be considered in the eastern section of the church environs.

6.7. The Procession Route

Historically, even as recently as the beginning of the 20th century, the procession road around the church in Brwilno Górne was "weeded," which means it was a dirt road with no improved surface. Currently, it is made of concrete pavement panels. Ideally, in terms of the church surroundings, the historical solution should be restored—the execution of an earth surface, consisting of rolled fine gravel or crushed brick.

6.8. High Vegetation

Seven monumental lime trees, the remnants of the original mass of fourteen lime trees, and one maple tree are all trees in very good condition in terms of health. A part of them, those growing in the eastern area of the church, have had their crown reduced so as not to burden the escarpment and so they do not threaten uprooting into the ravine or onto the church. They require proper maintenance, limited to an absolute minimum.

6.9. Tombstone Conservation

A significant element of the historical landscape of the cultural complex is the neo–Classical tomb located in the southeastern region of the church cemetery. It is in very poor technical condition and requires immediate conservation work. The work is all the more pressing as valuable architectural ornaments that even now are preserved only in fragments, may cease to exist.

7. Sources and Bibliography

Sources and Iconography

- Acts: "Brwilno." Płock Diocesan Archives.
- Acts: "Brwilno Land and Mortgage Register," Płocku Voivodeship Office, Płock State Archives.
- Photographs from the archives of the Płock Branch Office of the Voivodeship Office for the Protection of Historical Monuments in Warsaw.

- Inventory of historical monuments of the Diocese of Płock as managed by Canon Aleksander Dmochowski and Canon Władysław Turowski, typewritten manuscript and photographs held by the Płock Diocesan Museum, 1930 r.

Literature

- "Mazowsze w drugiej połowie XVI wieku" [Mazovia in the second half of the 15th century], *Atlas Historyczny Polski* [Historical Atlas of Poland], Warsaw, 1973.
- "Województwo Płockie ok. 1578" [Płock Voivodeship ca. 1574], *Atlas Historyczny Polski* [Historical Atlas of Poland], Warsaw, 1958.
- Architecture and Building Catalogue Card, author: Tomasz de Rosset, typewritten manuscript from the archives of the Płock Branch Office of the Voivodeship Office for the Protection of Historical Monuments in Warsaw.
- Architecture and Building Catalogue Card, author: Tomasz de Rosset, Danielczyk J., 1982, typewritten manuscript from the archives of the Płock Branch Office of the Voivodeship Office for the Protection of Historical Monuments in Warsaw.
- "Diecezja Płocka 2004, Struktura personalno–administracyjna" [Diocese of Płock: Personnel and administrative structure], *Rocznik Diecezji Płockiej* [Płock Diocese Yearbook], joint effort edited by Canon Rector Kazimierz Ziółkowski, Ph.D., photographs by Tomasz Dzwonkowski, Płock, 2004.
- Drągowski A., Glazer Z., Cabalski K., Radzikowski M., "Dokumentacja geologiczno-inżynierska w celu określenia możliwości zabezpieczenia i odbudowy skarpy w rejonie zabytkowego kościoła p.w. św. Andrzeja w Brwilnie Górnym" [Geological–engineering documentation for defining possibilities for securing and rebuilding the escarpment in the area of the historical church of St. Andrew in Brwilno Górne], Warsaw 2003, typewritten manuscript from the archives of the Płock Branch Office of the Voivodeship Office for the Protection of Historical Monuments in Warsaw.
- Drągowski A., Glazer Z., Cabalski K., "Doraźne zabezpieczenie osuwiska przy kościele św. Andrzeja w Brwilnie Górnym poprzez uregulowanie odpływu wody powodującej postęp procesów osuwiskowych" [The temporary securing of the landslide near the church of St. Andrew in Brwilno Górne through regulation of the outflow of water responsible for the ongoing slope failure processes], Łomianki, July 2003, typewritten manuscript from the archives of the Płock Branch Office of the Voivodeship Office for the Protection of Historical Monuments in Warsaw.
- Drągowski A., Cabalski K., Radzikowski M., "Zagrożenia budowli zabytkowych związane z rozwojem czynnych procesów geodynamicznych na przykładzie kościoła św. Andrzeja w Brwilnie Górnym" [The Church of St. Andrew in Brwilno Górne: Threats to historical buildings in connection with the development of active geo–dynamic processes – A case study] by Andrzej Drągowski, Krzysztof Cabalski, and Michał Radzikiewicz in *Przegląd Geologiczny* [Geological Review], vol. 53, no. 9, 2005, pp. 784–785.
- Dorawa Marian, "Ekspertyza konserwatorska zabytkowych organów kościoła parafialnego p.w. św. Andrzeja Ap. i M.B. Częstochowskiej w Brwilnie Górnym" [The historical organ of the parish church of St. Andrew the Apostle and the Blessed Mother of Częstochowa in Brwilno Górne: A conservation report], Toruń, September 2005.
- Glazer Z. "Notatka z wizji lokalnej przeprowadzonej w dniu 09.05.2002 r. w Brwilnie, dotyczącej powierzchniowych ruchów masowych, jakie zaistniały na działce, na której znajduje się zabytkowy drewniany kościół" [Note on the on–site inspection conducted on May 9, 2002 in Brwilno relating to the mass surface movements occurring on the site of the historic timber church], Warsaw, 2002.
- *Katalog Zabytków Sztuki w Polsce* [Catalogue of Art Heritage in Poland], vol. X, "Dawne Województwo Warszawskie" [The former Voivodeship of Warsaw], Book 15, Płock area, Warsaw, 1992.
- Mączyński D., Tajchman J., Warchoł M., "Materiały do terminologii konstrukcji więźb dachowych podstawowe pojęcia" [Materials on roof structure terminology: Basic concepts], *Monument*, vol. II, edited by Tadeusz Morysiński, 2005.
- Miśkiewiczowa M., *Mazowsze płockie we wczesnym średniowieczu* [Płock Mazovia in the early Middle Ages], Płock, 1982.
- Muszyńska H., "Catalogue Cards of Moveable Heritage," December 1968.
- Omilaniowska M., "Antoniówka," *Spotkania z Zabytkami* [Meetings with heritage], 1988, no. 6.
- Study within the framework of "Archeologicznego Zdjęcia Polski" [An archeological picture of Poland], typewritten manuscript from the archives of the Płock Branch Office of the Voivodeship Office for the Protection of Historical Monuments in Warsaw.
- Słownik Geograficzny Królestwa Polskiego i innych krajów słowiańskich [A geographical dictionary of the Kingdom of Poland and other Slavic countries], Warsaw, 1880–1892.
- Stępien P., "Zasady postępowania w ochronie zabytkowych budowli drewnianych" [Guidelines for procedures in the protection of historical timber structures], *Renowacje* [Renovation], 1998, no. 2, pp. 14–17.
- Szałygin J., Wiśniewski J. A., "Materiały do katalogu drewnianego budownictwa sakralnego na Mazowszu" [Materials for the catalogue of timber church structures in Mazovia], *Mazowsze* [Mazovia], 1994, no. 3(4), pp. 3–104.
- Tajchman J., "Propozycja systematyki i uporządkowania terminologii ciesielskich konstrukcji dachowych występujących na terenie Polski od XIV do XX w." [A proposal for systematizing and ordering carpentry terminology encompassing timber roof structures occurring on Polish territory from the 16th to the 20th centuries], *Monument*, vol. II, edited by Tadeusz Morysiński, 2005.
- Witkowski W., *Wybrane problemy z zakresu badań i konserwacji drewnianej architektury sakralnej Archidiecezji Łódzkiej* [Selected problems in the study and conservation of timber church architecture of the Łódź Archdiocese], Łódź, 2005, pp. 9.

POLAND

Faculty of Architecture, Warsaw University of Technology

CURRICULUM VITAE

Stefan K. Wrona

EDUCATION: Faculty of Architecture, Warsaw University of Technology, Poland. MS Architecture, 1969. PhD Architecture, 1972. Habilitation, 1982, (advanced research qualifications). Full Professorship since 1994.
EXPERIENCE:
- architectural and town planning practice,
- experience in design teaching and in teaching of computer-aided design,
- research in design methods, computer-aided design and a new Information Technology as a tool for protecting cultural heritage in Europe
POSTS HELD:
- Lecturer, Assistant Professor, Associate Professor and Professor in Design, Faculty of Architecture, Warsaw University of Technology, since 1970,
- Chief Project Architect, Warsaw Development Planning Office, 1976-1978,1987-1991,
- Partner and joint manager of design office: CYBIS & WRONA, 1971-1980, and since1987,
- Deputy Head of the Institute of Architectural Design at Warsaw University of Technology, 1984-1987,
- Vice-Dean of the Faculty of Architecture, Warsaw University of Technology, 1987-1990, 1993-1994.
- Dean of the Faculty of Architecture, Warsaw University of Technology, 1994-2002.
PUBLICATIONS: 52 publications and technical papers on design and computer-aided design.

Krzysztof Koszewski

Academic Degrees: Master of Sciences - architecture, 1993
PhD – architecture, 2006
Education
1981-1985: Secondary School II Liceum Ogólnokształcące im, Stefana Batorego, Warszawa Secondary School
1985-1993: Faculty of Architecture, Warsaw University of Technology architecture Diploma: "Visual Arts Center at the Rozdroże Square – extension of the Center for Contemporary Art in Warsaw"
Research and Professional Experience
1989-1992-1993: Contribution to architectural-historic research at the Castle of Janowiec near Kazimierz Dolny, Poland, and the reconstruction of historic phases of the castle.
1990: Responsible for drawing documentation of archaeological excavations at Beit Jimal, Israel, conducted by Studium Biblicum Franciscanum of Jerusalem.
Practice at the architect's office of Zeev Baran, Jerusalem.
1991: Internship of Historic Buildings American Survey and American Committee of ICOMOS, Apostle Islands, Wisconsin, USA
1992: Activity in the field of graphic design, establishing own studio, over 200 projects of music covers for world leading music companies in Poland from
1993: Archeological Survey at Beit Jimal, Israel, conducted by Studium Biblicum Franciscanum of Jerusalem, coordinator.
fom 1995: Responsible for the information about Faculty of Architecture
2000: "Theoretical background of creating a knowledge base in the web" – a research work for Faculty of Architecture, WUT
from 2000: Coordination of and supervision of the New Media Lab at the Faculty of Architecture
2001: "Analisys of text-graphic databases in the context of historic-architectural knowledge" – a work for the Faculty of Architecture, WUT
2002: Member of the organizing team of the international eCAADe conference held at the Faculty of Architecture, WUT
2002-2006: Research on the item of a model of historic-architectural dispersed knowledge base, a case of Saska Kępa, a district of Warsaw built in the 20's and 30's. PhD dissertation at the Faculty of Architecture, WUT, under supervision of prof. Stefan Wrona, PhD.
Educational Experience
from 1989: Laboratory of Computer Techniques – workshops and seminars with students
1992-93: Preservation and Conservation of Historical Monuments – the course seminars, tutor
1994-95: Graphic Design – the course seminars, lectures and designs, in cooperation with Academy of Fine Arts, Warsaw
from 2000: New Media in Architecture, a series of seminars on video techniques, some results presented at the International Festival of Video In Architecture, Florence 2002
2000-2004: Introduction of the new program of Laboratory of Computer Techniques at the first year of studies at the Faculty of Architecture, WUT
Publications
1995: Koszewski, Krzysztof "Communication of Ideas in Architecture Versus Computer Techniques", CAD Space (Proceedings of the III International Conference – Computer in Architectural Design), Białystok, pp. 171-180
1995: Koszewski, Krzysztof, Wrona, Stefan "The Role of Multimedia in the Presentation of Student's Designs" (Proceedings of the 13th European Conference on Education in Computer Aided Architectural Design in Europe, Palermo, pp. 273-280
2002: Koszewski, K., Kowal, S., Rzadkiewicz, R., Slyk, J. and Wrona, S. "Virtual Modeling and Multimedia Presentation as the Basic Principles of CAAD Education in Warsaw School of Architecture", Connecting the Real and the Virtual - design e-ducation [20th eCAADe Conference Proceedings Warsaw, pp. 126-129
2002: Koszewski, Krzysztof, Wrona, Stefan (Eds.) (2002) "Connecting the Real and the Virtual - design e-ducation", 20th eCAADe Conference Proceedings / ISBN 0-9541183-0-8] Warsaw (Poland) 18-20 September 2002, 632 p.
2005: Kabata, Michal and Koszewski, Krzysztof (2005) A Model of Dispersed Historic Architectural Knowledge Base, in: Digital Design: The Quest for New Paradigms [23nd eCAADe Conference Proceedings / ISBN 0-9541183-2-4] Lisbon (Portugal) 21-24 September 2005, pp. 565-572
2006: Koszewski, Krzysztof, Slyk, Jan, Wrona, Stefan „Information into knowledge – the pathway to information modelling through architecture and urban context analysis", in: Informative Modelling for the Architectural Heritage" [Proceedings of the International Workshop], Saint Maximin la Sainte-Baume, VII 2006, pp. 13-20.

Robert M. Kunkel

Adjoint professor at the Faculty of Architecture, Warsaw University of Technology

PERSONAL DATA: born 26.04.1949 Warsaw, Poland; dipl.: 1967 – Tadeusz Reytan College, Warsaw; MSc: 1972 Faculty of Architecture Warsaw University of Technology; PhD: 1986 right there;

PROFESSIONAL EXPERIENCE: 1973-1977 scient.assistant in Computer Institute in Warsaw; from 1977 scient.assistant (from 1986 adjoint professor) at the Faculty of Architecture, Warsaw University of Technology; 1995-2002 (paralelly) chief executive, then scientific director of the State Centre for Documentation of Historical Monuments; from 2000 also lecturer in the Institute of Art History at the Warsaw University; Member of ICOMOS (1994-)

LECTURES AND SEMINARS: Theory and History of Architecture, Semantics of Architecture, History of Medieval Architecture, Documentation of Architecture;

COMPUTER SKILLS: MS Office; Adobe Photoshop;

LANGUAGE KNOWLEDGE: English; (passive German, Italian, Russian)

POLAND

Faculty of Architecture
Cracow University of Technology

Project Report

Andrzej Kadłuczka
Faculty of Architecture, Cracow University of Technology

1. Introduction

Wood is one of the oldest and most traditional construction materials to occur in the territories of Poland. This is demonstrated in the case of Biskupin in central Poland: an early Slavonic wooden settlement, dating back to the close of the Bronze Age and the beginning of the Iron Age (750-600 B.C). It was discovered before the Second World War. It belonged to the so called Lusatian [Łużycka] culture. Both the defensive and housing structures that were unearthed during excavations were constructed solely of wood. It is noteworthy that the prewar researchers have determined two basic types of structure occurring in Biskupin: a monolithic one, called in Polish "konstrukcja zrębowa" [corner-joining, also known as blockwork] and a timber frame system, or the so called "konstrukcja sumikowo-łątkowa". Analogical construction systems were discerned at the end of the 19th century by a Norwegian scholar Lorens Dietriechson, who defined the corner-joining or in another words the blockwork system – German "Blockbau" and the timber frame system – German "Fachwerk". Both in Biskupin and in other parts of early medieval Poland blockwork constructions were used for defensive buildings because of their greater durability (despite the larger quantities of material that were demanded) , whilst more economic timber frames, which also represented more sophisticated building technique, were used for shelters – houses inside the perimeter of defense settlements.
It is quite typical that blockwork constructions were widespread in those regions where forests abounded, whereas in the territories that were less rich in wood, the framework system was much more common. Technological and typological topography is also quite adequate, which means that blockwork was commonly used in early medieval South-Eastern Poland, whereas timberwork was widespread in Northern and Western Poland.

Wooden churches were constructed at the same time as the stone ones. It is probable that already during the time of Christianization of Poland (which took place at the close of the 10th century) they constituted a majority of all Catholic churches in the state ruled by the early Piast dynasty.
A genesis of form and spatial layout is however still unclear and remains a matter of dispute. Tadeusz Dobrowolski, a renowned Polish art historian, held that " they [wooden churches] might be considered as a heritage of the past that is itself older that the Gothic one, as well as a classical example of people's conservativeness".
In connection with the more up-to-date research of Brykowski (3) and Kornecki (4) there is no doubt that wooden churches, regarding their form, functional and spatial layouts, were a projection of the structures constructed of masonry. However, they were built by local carpenters to satisfy the needs of the local community and were based on the immediately available building materials. They are also a testimony of cultural aspiration, as Kornecki has shown: "Everything that in the course of the centuries has influenced the shape and character of Polish wooden churches had its beginnings in principles which were born in western cultural circles, and was generally influenced by the necessities of liturgy". In this case, it might be said that the unique character of that kind of building results from a specific symbiosis of traditional materials and of carpentry – craftsmanship - with the rules of composition of architectural space that stemmed from the Western examples.
The addition of the wooden churches in Binarowa, Blizne, Dębno, Haczów, Lipnica Murowana and Sękowa to the World Heritage List is unquestionable evidence that the wooden churches of the Małopolska region are "a unique phenomenon in the world, one that is strongly connected both with the common European ideological values and local building tradition. They were the most valuable, elite buildings that derived their functional and spatial composition from the demands of liturgy that were accepted in Poland along with Catholicism. Until the present day they are a true enclave situated at the cultural border of the Orthodox East and Catholic West." (6)

The general typology of wooden churches in Southern Poland responds to that of their predecessors, which were constructed of stone and brick - suffice it to compare the academically proven reconstructions of churches from the Małopolska region, such as the ones in Prandocin (early 12th c.) or in Wysocice (early 13th c.), with the oldest wooden churches in Dębno (mid-15th c.) or in Haczów (end of the 14th c.). Analogies in function and architectural composition are evident.

From the point of view of typology based on the analysis of form, the lion's share of wooden churches, especially of the older ones, represent the two-part [also called bigeminal] type consisting of a formally coherent volume of the nave and presbytery and of a tower adjoining this volume. The tower was a dominant element in this composition.

The question of an architectural solution of a volume consisting of a nave and a presbytery, however, requires an elaboration. In spite of the fact that the majority of plans of churches show a certain distinction between a nave and an added presbytery (7) which most likely caused a widespread interpretation of this type as a two-part one (8), from the point of view of construction, a nave and a presbytery are indeed one volume. The nave has a sophisticated "encasement" [zaskrzynienie] (9) that is covered either by a separate roof (as in the case of Haczów) or by a prolonged surface of the main roof, which is slightly slanted at a different angle along the encasement – as is the case in Dębno, Harklowa or Łopuszna. Functional analysis shows that we are dealing with the trigeminal composition: a large nave has a presbytery, which is often closed orthogonally from the eastern side, and in the western part there is a vestibule or a porch located at the bottom of a tower, which is very clearly connected with a concept of a "Westwerk" known from Western Romanesque architecture. That spatial incompatibility of a volume with its functional disposition is a result of an attempt at connecting a nave with a presbytery into one whole, both formal and constructional, and to endow that whole with a monumental character stressed by a homogenous structure of a roof, inspired by the form of a stonework or brickwork Gothic temple.

The oldest wooden churches that are preserved in the Małopolska region are: the church in Haczów (end of the 14th c.), in Grybów ca. 1455, burnt in 1945, Mogiła (now Cracow) mentioned in 1466 and enlarged in the 18th c., in Blizne (2nd half of the 15th c., , reconstructed in 18th and 19th c.), in Dębno Podhalańskie (2nd half of the 15th c., rebuilt in the 17th c.), in Harklowa (2nd half of the 15th c.), and in Lipnica Murowana (end of the 15th c.). The church in Dębno Podhalańskie belongs to the most valuable examples of wooden sacral architecture. It has a nave and a presbytery covered with a unified roof. There is a tower at the western side, in skeleton (carcass) construction, with a mock starling. Typologically, the church in Haczów is very close to the aforementioned one, however it is older, with a polygonal presbytery; so is the church in Blizne, with a detached starling-tower.

During the Baroque period many wooden temples were constructed in Poland, most of them with stunningly enriched spatial forms. The church in Tomaszów Lubelski (1737-40) has an elongated, integrated nave and presbytery, aisles and a two-part western façade. In Mnichów (1767-70) there is an orthogonal cupola above the intersection of the nave and transept; such is also the case in Libiąż Wielki (1732-41). In Przytkowice, the church of 1733 has a typical central layout with a detached starling tower.

In Silesia, different types of framework (half-timber construction) were widespread. Until the present day they testify to West European influences and structural solutions, which were adapted to the local needs by vernacular workshops. The splendid, early Baroque Evangelic "churches of peace" in Jawor and Świdnica, built in half-timber construction, are among the best examples of such buildings. There are also, however, single-nave wooden churches based on medieval traditions with corner-joining [konstrukcja zrębowa] such as the church in Księży Las (1494) or in Olesno (1518).

An entirely separate and architecturally unique group of wooden buildings consists of the Orthodox and Greek Catholic [Uniate, from the Religious Union in Brześć Litewski in the year 1596] churches, both known in Polish under the name "cerkiew", that were built in the areas inhabited by these religious communities. These territories are identical with the historic southern parts of the Commonwealth of Poland and Lithuania, now in the Lubelskie and Podkarpackie voivodships and in western Ukraine.

These wooden temples, built in the circle of the Orthodox religion, are unique examples of a combination of a longitudinal plan that was widespread in Roman Catholic churches with a central layout, generally applied in the Eastern European and Byzantine culture. In Orthodox and Uniate churches in the eastern parts of the Małopolska region, in Belarus, Ukraine and in Podolia, the dominating type is a tripartite [trigeminal], axial-symmetrical composition, where a square-shaped nave is covered with a special architectural form, thus competing with the dominant tower and corresponding clearly to a cupola that usually crowns central layouts of eastern churches. The churches [cerkwie] of the region along the River San [Nadsanie] (10) provide a perfect illustration of the competing influences. Churches in Chotyń, Tyniowce and Opaka have formal culminations above their central part that are formed as globular or onion-shaped domes, while in Leżachów, Łukawiec, and Wólka Żmijowska a dominating central part, based on a square plan, is covered with a pavilion-like, broken-form roof [also known as the Polish roof]. The shape echoes the bell-towers of rather dumpy proportions that were known from wooden Roman Catholic churches.

Another very specific and strongly differentiated set of wooden structures encompasses synagogues and Jewish houses of prayer. Jews in Poland have a long and extremely rich tradition and culture. Feliks Kiryk, a renowned historian, writes that Jews were already present in the political and economic life of Poland in the times of the Piast dynasty; and they were mostly settling in cities. They constituted "a religious group, very

difficult to be assimilated by the Christians, but owing to their talents and skills, such as the expertise in financial matters, they were closely connected to the state authority, which in turn has guaranteed their security." (11) Contrary to the wooden churches (both Catholic and Orthodox ones) that were built in the countryside, Jews located their temples mainly in towns and cities where there were proper conditions for their economic development and activities.

Unfortunately, a large number of wooden objects were transformed into masonry, for reasons of prestige. The remaining ones were deliberately destroyed by Nazis during World War II (12). Maria and Kazimierz Piechotka, architects and well-known researchers of architectural Judaica, wrote: "Wooden synagogues do not exist – they shared the tragic fate of the faithful, who were praying there; both became victims of the Holocaust" (13).

Archival sources allow for an interpretation of those structures as absolutely outstanding examples of the use of local carpentry and wood-carving traditions for the Mosaic liturgical ideals and of the assimilation of clearly discernible Oriental influences brought by the eastern cultures such as those of the Armenians and Ruthenians, and also of the assimilation of influences of the West. Large Jewish communities were settled everywhere in South-Eastern Poland. Wooden structures existed for instance in the larger towns of the Lublin, Przemyśl and Rzeszów regions – such as Zamość, Józefów, Kraśnik, Łączna, Szczebrzeszyn, Tarnogród, Przemyśl or Jarosław, but the majority of wooden synagogues and houses of prayer were rebuilt during the 18th c. and at the beginning of the 19th c.

The unusual richness of functional and spatial solutions using all the advantages of wooden constructions that can clearly be seen in Polish sacral architecture, stems both from the liturgical and doctrinal requirements of the various religions present in the Polish territories, and from stylistic transformations in art and architecture.

2. Subject of the research

The research zone of the current project is limited to the Southern Poland. Both in the geographical and historical senses, todays Southern Poland comprises regions of Silesia (Western part) and Małopolska (Eastern part). Silesia and Małopolska are also cultural regions, replete with monuments of sacral wooden architecture: Protestant, Catholic, Greek-Catholic, Orthodox and Jewish ones.

Characteristics of wood – the material used for construction of these structures, that is susceptible to fire and to mechanical, biological and chemical corrosions, caused inevitable destruction. Currently there are only 700 existing wooden structures of that kind. For instance, once there were 500 sacral structures in Silesia; now there are only 130 of them left.

Currently, the regions of Małopolska and Silesia are divided into 7 voivodships: Dolnośląskie, Opolskie, Śląskie, Małopolskie, Świętokrzyskie, Podkarpackie and Lubelskie.

In Małopolska voivodship there is a wooden architecture route, more than 1500 km long, with 123 Roman Catholic churches and 39 Uniate and Orthodox ones. Among them there are objects from the World Heritage List: churches in Sękowa, Binarowa, Lipnica Murowana and in Dębno Podhalańskie.

In Polish Carpathians and in the adjoining Podkarpacie [Antecarpathians] region there are 240 wooden structures; in the historic regions around the cities of Lublin and Zamość there are ca 50 of them.

Due to the latest report by the National Centre for Research and Monument Documentation [Krajowy Ośrodek Badań I Dokumentacji Zabytków], 62% of structures are in good condition but the rest requires a considerable intervention and repair. There are still some structures which are ruined.

The following table shows the general condition of wooden monuments in the aforementioned regions:

Current condition	Architectural Monuments in Poland	Wooden Monuments of Sacral Architecture
No intervention required	9 %	14 %
Required intervention: maintenance, small interventions	36 %	48 %
Required intervention: complex protection	19 %	17 %
Required intervention: general renovation	23 %	13 %
No data	13 %	8 %

Analysis of the current state of this unique and priceless heritage of wooden sacral architecture clearly shows its diverse technical, functional, formal and legal status. It is noteworthy that the governmental conservation service has, in general, completed a comprehensive scientific documentation. Registered objects have the so called evidential cards, where current data pertaining to monument preservation are collected. The majority of wooden churches in the Upper Silesia, Lower Silesia and in Małopolska is well

protected, well used and incorporated into the structure of "wooden architecture routes". In the Eastern voivodships however, the situation is more complicated.
The monuments there were and are located in the complex cultural and religious environment; tremendous migrations during and after the Second World War, and the war itself resulted largely in desolation, devastation or even in burning of those structures (14). The aforementioned susceptibility to mechanical, biological and chemical corrosion, very low fire resistance and the lack of suitable protection - are a serious hindrance in maintenance and in adequate conservation; they are also the main cause of devastation and indivertible loses of historic wooden substance.

This research project has been realized in a close and indeed essential cooperation with the State Service of Monument Preservation [Państwowa Służba Ochrony Zabytków] and its voivodship departments, which have the necessary expertise and moreover are in charge of basic documentation of structures that we were interested in. That is why the first "methodological" step was to get in touch with five voivodship offices for conservation which are responsible for protection of monuments of the two great historical regions of Silesia and Małopolska (15). They were:

1. Lower Silesia Voivodship Monument Conservator [Dolnośląski Wojewódzki Konserwator Zabytków]
2. Silesian Voivodship Monument Conservator [Śląski Wojewódzki Konserwator Zabytków]
3. Małopolska Voivodship Monument Conservator [Małopolski Wojewódzki Konserwator Zabytków]
4. Podkarpackie Voivodship Monument Conservator [Podkarpacki Wojewódzki Konserwator Zabytków]
5. Lubelskie Voivodship Monument Conservator [Lubelski Wojewódzki Konserwator Zabytków].

The draft of the research project was presented to the above authorities, as well as a request to select two wooden sacral structures in their respective areas, due to strict criteria such as:

a) a structure has to be listed
b) its stylistic and architectural features have to be of outstanding quality in its cultural environment
c) a structure requires immediate intervention.

A list of 10 structures (2 of them from each region) was drawn up during working meetings. Research team started to proceed according to special forms that were prepared by the project leader, thus gathering a digital database. The list is as follows:

In the Lower Silesian Voivodship

2.1. PAWŁÓW TRZEBNICKI, ROMAN CATHOLIC CHURCH

Locality: Pawłów Trzebnicki
Administrative division – voivodship: Lower Silesian, commune: Prusice
Owner: Roman-Catholic parish in Wszemirów
Original Use: sacral - Evangelic church
Present User: Roman-Catholic parish
Time of Origin: 1709, bell-tower from the beginning of the 19th c.

In medieval times in Pawłów there was a chapel which was a "filia" of a church in Trzebnica; more or less in the year 1550 the chapel was taken over by the Evangelical community and in 1554 it returned to the Catholic Church. In 1708, Protestants had received the chapel again and they built a church there that stands until today. The church was used by the two confessions, and Catholic priest came from Trzebnica. The present Baroque church was built in 1708-1709 as a Protestant church. Skeleton construction, built on a plan of a Greek cross, is crowned in its central part by a cupola with a lantern. Mansard roof covering a central part, octagonal with "lids"; over the porch a saddleback roof covered with copper plates and slate. Windows - round and elliptic. Interior is encircled by two-storey clerestories; Baroque furnishing (half of the 18th c), main altar of carved wood, painted, analogically the pulpit and organ prospectus; stone font. Outside, on the southern wall there is a Baroque sandstone epitaph of Magdalena and Sigmund Fanigten from the year 1684.
Beside the church, there is a free standing, three-storey, square, wooden bell-tower
with skeleton construction dated to the beginning of the 19th c. with a pavilion-like roof [also known as a stacked roof] covered with shingle. The church was taken over by the Roman Catholics in 1945 and renovated in 1972. Near the entrance to the churchyard there is a durmast, 160 years old.

1. Church in Pawłów (Lower Silesian Voivodship) view założenia
2. Church in Pawłów (Lower Silesian Voivodship) view of the central par
3. Church in Pawłów (Lower Silesian Voivodship) interior with the view of the presbytery

2.2. POGORZELISKA, PROTESTANT CHURCH

Locality: Pogorzeliska
Administrative division – voivodship: Lower Silesian, commune: Chocianów
Owner: Roman-Catholic parish of St. Jack
Original Use: sacral - Evangelic church
Present User: Roman-Catholic parish
Time of Origin: 1656

St.Jack's church was built in half-timber construction by the Protestants. Inside there are wall paintings (balcony and ceiling) and a unique "palm" pier supporting the ceiling. Interior elements reach back to the years 1682-1688. The initiator and founder of the church was Wolf Alexander von Stosch with his wife who descended from the von Kottwitz family. Members of the von Schkopp family, owners of Parchów, were also patrons of this church. In 1718 the parish was restored and taken over by the Catholic church. Other renovation works were held in 1966 and 1983.

4. Church in Pogorzeliska (Lower Silesian Voivodship) half-timber wall of the presbytery

5. Church in Pogorzeliska (Lower Silesian Voivodship) view from the south

6. Church in Pogorzeliska (Lower Silesian Voivodship), interior with the view of the choir

In the Silesian Voivodship

2.3.OSTROPA, ROMAN-CATHOLIC CHURCH

Locality: Ostropa
Administrative division – voivodship: Silesian, commune: Gliwice
Original Use: sacral - Roman –Catholic church
Present User: unused since 1926
Time of Origin: Presbytery from the 15th c., wooden nave 1640.

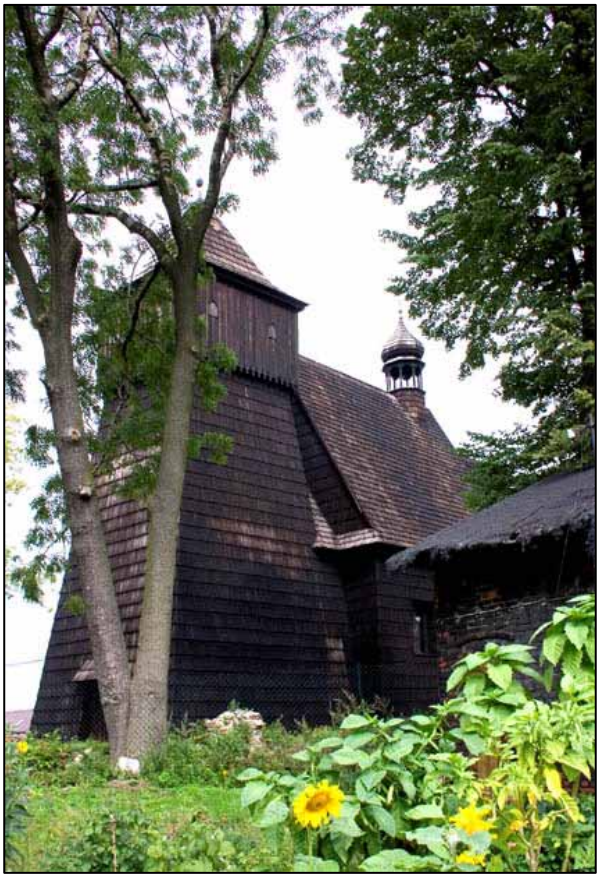
Typical features of wooden churches from Upper Silesia are: roof ridge of varying height above the nave and presbytery, blockwork construction made of coniferous wood, based on stone or wooden sills, eaves covering corner joints, often projecting and forming a kind of an external narthex or arcades [Polish soboty, literally Saturdays; for shelter of pilgrims arriving on Saturday for the Sunday mass]; tower with post-frame construction is separated form the blockwork itself. Ostropa was mentioned for the first time in 1286. The church, which was burnt during the Hussites wars, is also mentioned in sources from the year 1340.
The current structure (St. George's church) hails from the year 1640. In 17th c. it was partly destroyed by the Swedish army and rebuilt in 1667-68. The church is oriented. It has wooden nave of blockwork construction set on brick basis and a tower and a porch of post-frame construction. Late Gothic presbytery and sacristy built of brickwork were added in 1693. Inside the church, there is a polychrome dated to 1668 and various interior elements from the 17th and 18th Century. The church was originally covered with shingles. Today the Neo-baroque church of the Holy Spirit, built and consecrated in 1927, is the parish church of Ostropa. The old church's interior elements were partly transferred there.

7. Church in Ostropa (Silesian Voivodship) , interior with the view of the presbytery

8. Church in Ostropa (Silesian Voivodship) interior with the view of the choir

9. Church in Ostropa (Silesian Voivodship) view from south-west

10. Church in Ostropa (Silesian Voivodship) view from north-east



2.4.RODAKI, ROMAN-CATHOLIC CHURCH

Locality: Rodaki
Administrative division – voivodship: Silesian, commune: Klucze
Original Use: sacral
Present User: Roman-Catholic church
Time of Origin: 1601, bell tower from the 18th or 19th Century

The church has one nave with a sacristy and arcades from the north. Roof is covered with shingle; has a Baroque ridge turret. Inside the old temple there are valuable pieces like: late Baroque main altar with a painting of St. Mark, which was renovated in 2001; early and late Baroque crucifixes, a sculpture of Jesus Christ Resurrected from the 17th century and a painting of Our Lady with the Child. There were also: a sculpture of St. Nicholas and a Baroque epitaph of the Reverend Krzysztof Zawalski, which now can be admired in the new church in Rodaki. The church, like a majority of wooden temples has "soboty" [see tanslator's note in Ostropa] - arcades supported on pillars, giving a shelter to pilgrims. The church, named the Wooden Pearl of Jura, was put on a list of wooden structures and included into the "Wooden Architecture Route" of Małopolska in 2001. The inhabitants of the village of Rodaki took great care about the church and largely owing to them it survived intact until now. March 1928 is a special date for the church; because of fire, caused by children playing around, all the wooden cottages in the village were burnt, save for the church itself; this was considered a miracle. In 2001, given the 400th anniversary of the church, the local inhabitants volunteered to order the surroundings and in 2003, within a project called "Bell Tower in the Land of White Snow", which was inspired by the Village Council, the bell tower was renovated.

11. Church in Rodaki (Małopolskie Voivodship) view of the presbytery

12. Church in Rodaki (Małopolskie Voivodship) view of the joining of the wall of the presbytery

13. Church in Rodaki (Małopolskie Voivodship), interior with the view of the presbytery

In the Małopolska Voivodship

2.5. SROMOWCE NIŻNE, ROMAN-CATHOLIC CHURCH

Locality: Sromowce Niżne
Administrative division – voivodship: Małopolskie, commune: Czorsztyn
Owner: Roman-Catholic Parish
Original Use: sacral , Roman-Catholic church
Present User: unused since the 1980
Time of Origin: 1513

The church of St. Katherine, originally consisting of one space, enlarged many times, oriented; one nave with prolonged presbytery based on a triangular plan and on the opposite side with an enlargement , which was previously a part of the porch under the tower. Rebuilt in 17th c. after repeated floods. Post-frame construction with sloping walls and a mock starling crowned by a spire. Roof with one ridge, covered with shingle, with a parallelepiped tower with an onion-shaped helmet.
Sacristy and porch were added in 1894. The interior is covered with flat ceilings. Valuable pieces of the original interior were: a Gothic triptych from the end of the 14th c. with a copy of a sculpture of St. Mary with the Child, two wings of triptych from the 15th c. and a wooden font from the 16th c. are to be found in the new church that was built nearby.
The figure in the older triptych is a copy of the 14th c. sculpture exhibited in Tarnów Diocesan Museum. Inside the old church there are still paintings of St. Anthony of Padua (18th c.), St. Katherine of Alexandria (18th c.), and a Baroque pulpit.

14. Church in Sromowce (Małopolskie Voivodship) view from the west
15. Church in Sromowce (Małopolskie Voivodship) wooden ridge turret

2.6. DUBNE, GREEK-CATHOLIC CHURCH

Locality: Dubne, previous name Dubna /1794/
Administrative division – voivodship: Małopolskie, commune: Muszyna
Owner: Roman-Catholic parish of Muszyna
Original Use: sacral , Greek-Catholic (Uniate) church
Present User: Roman-Catholic parish
Time of Origin: 1863

Dubne is a village located close to the Polish border, on the other side of the river Poprad there is a Slovak village named Obruche. The name of Dubne comes from the local mountain stream; it was located in the year 1603 by Michał Leluchowski on the Vallachian law, with a privilege and permission granted by Bishop Maciejowski. The area was traditionally inhabited by the Lemkos [Łemkowie; ethnic group of Vallachian-Ruthenian origin]; following the atrocities of the Second World War, in the years 1945 -1947 they were deported to the Soviet Union or to the North-Western territories granted by the Allies to the postwar Poland in exchange for the loss of the Eastern parts. The Lemkos left a heritage of wooden Greek – Catholic churches.
The church in Dubne was founded and endowed by Bishop Andrzej Trzebnicki in the year 1673. The original church was burnt and was replaced in the year 1863 by a wooden structure based on a central plan, in blockwork construction with a post-frame tower. Tripartite composition [also known as trigeminal], one nave with a saddleback roof, shingles under sheet metal roofing. Three onion-shaped turrets with blind lanterns. There is an original interior from 19th century, preserved intact: Neo-Classicist altar of the 19th c. and Rococo-Classicst iconostas with icons of the 19th c., as well as small altar with a painting of St. Archangel Michael.

16. Greek-Catholic Church in Dubne, (Małopolskie Voivodship) view from the east
17. Greek-Catholic Church in Dubne, (Małopolskie Voivodship) onion-shaped turrets
18. Greek-Catholic Church in Dubne, (Małopolskie Voivodship) interior with iconostas

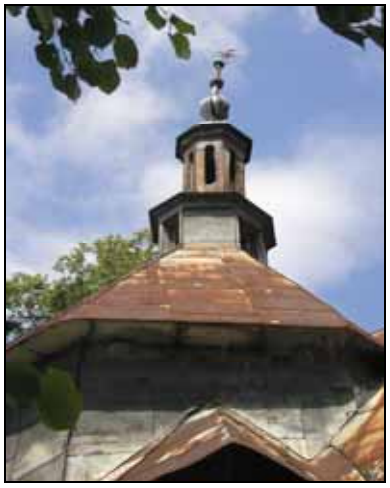
In the Podkarpackie Voivodship

2.7. MIĘKISZ STARY, GREEK-CATHOLIC CHURCH

Locality: Miekisz Stary
Administrative division – voivodship: Podkarpackie, commune: Laszki
Owner: Roman-Catholic parish of Miękisz Stary
Original Use: sacral , Greek-Catholic (Uniate) church
Present User: unused
Time of Origin: 17th c., 1885, 1893, 1916.

The Greek-Catholic church of the Protection of the Purest Mother of God [cerkiew Pokrowy Przeczystej Bogarodzicy] is situated in the centre of the village of Miękisz Stary, on a hill, south from the road Laszki - Tuchola.
The sanctuary is oriented; the structure is surrounded by the old trees. Right by the eastern wall of the church there are two sandstone tombs and slightly further there is a large tomb with a Christ's figure. Until 1976 on the axis of the church, from the eastern side, there was a detached bell-tower in a post-frame construction.
The church itself is wooden, trigeminal, built in a blockwork construction. The structure is not homogenous; the oldest part consists of the walls of the sanctuary in corner-joining construction; in the end of the 18th c. the nave and the women's porch [babiniec] were added (according to T. Spiss, this took place in 1801; other sources, such as *Szematyzmy…*report the year 1811). Most likely in the year 1885 new vaults and roofs were constructed above the sanctuary, nave and women's porch, new sacristy and most likely a proper porch was added, as were wall paintings. It is however not excluded that the present vaults of the sanctuary, nave and women's porch existed since the first enlargement. This seems to be confirmed by the exchange of shingle for a sheet metal roofing in the year 1893 (as the date in the ridge turret has it). In 1916 the church was renovated after damages caused by the war. The choir was enlarged, the roof was renovated and the external planking was exchanged.





19, 20, 21, 22, 23.
Miękisz Stary, state in the year 2006

2.8. BABICE, GREEK-CATHOLIC CHURCH

Locality: Babice
Administrative division – voivodship: Podkarpackie, commune: Krzywcza
Owner: Commune of Krzywcza
Original Use: sacral , Greek-Catholic (Uniate) church
Present User: unused
Time of Origin: 1840, 1888

The village of Babice existed as early as in 1389, in 1407 it became a town. The Greek-Catholic church of the Dormation of the Mother of God [cerkiew Zaśnięcia MB] church was built in 1840. Until the time of deportation of the local inhabitants of Ukrainian origin, it was a branch of a parish in Skopów. The church was renovated in 1888 and the works during that period were focused on the exchange of the roof covering from shingle to iron sheets.
The church is oriented, located in the south-western part of the village, on a hill sloping steeply towards the left bank of the river San. It is surrounded by the old lime and chestnut trees. There is a bell-tower from the western side (slightly off the axis towards the south) and farm buildings from the north. Local road from the west.
The wooden church has one space, with sacristy from the north (both in blockwork construction) and porch from the west (skeleton construction). Corner-joints with covered tenons. The sill of the sacristy is tenoned from the north to the main volume. Wooden posts (columns) inside the main space create a spatial division, thus producing pseudo-aisles of 150 cm width. Western porch in skeleton construction. The main volume (nave-cum-presbytery) has a three-sided form on the eastern side; roof frame consists of posts and rafters.
In the middle of the ridge the octagonal pseudo-lantern in skeleton construction is integrated into the roof frame. The roof frame above the sacristy is of the rafter type.
Inside, along the western wall – there is a choir, supported by two pillars in the front part and by two in the western one, with a balustrade of planks, accessible through the staircase along the western wall. Sanctuary is separated from the main space by a curtain wall of wooden planks. Walls are boarded on the outside (planked with laths). Beams are protected by a narrow eaves-like roof supported on posts , covered with shingle. There is a hipped roof of five surfaces with one ridge, half-hipped from the west, covered with iron sheets. Saddleback roof over the porch is covered with shingle.

24. Greek-Catholic Church in Babiniec (Podkarpackie Voivodship) view from południa

25. Greek-Catholic Church in Babiniec (Podkarpackie Voivodship) interior with the view of the iconostas and presbytery

26. Greek-Catholic Church in Babiniec (Podkarpackie Voivodship) bell-tower

In the Lubelskie Voivodship

2.9. BUDYNIN, GREEK-CATHOLIC CHURCH

Locality: Budynin
Administrative division: voivodship: Lubelskie, commune: Ujhówek
Original Use: sacral, Greek-Catholic Church
Present user: Roman-Catholic Church
Time of Origin: 1887, wooden bell-tower 1888

The former Greek-Catholic church of the Immaculate Conception of Our Lady [cerkiew Niepokalanego Poczęcia NMP] in Budynin was built in 1887 according to the traditional rules of construction of the ancient Orthodox churches, thus following the wooden church which existed there since 1774. The church was then transformed into an Orthodox one. The structure is oriented, wooden, built in blockwork construction with corners joined in a fishtail manner [zwęgłowana na rybi ogon] on a brickwork sill. It has a classic trigeminal form, presbytery is closed triangularly; it has wider nave and a narrower women's porch which width equals that of a presbytery. There are two sacristies by the presbytery - from the northern and southern side. Every part is covered with octagonal cupolas with lanterns supported by octagonal high drums. Inside there are octagonal fake vaults and ceilings in sacristies. Outside a projecting eave supported on beams of the blockwork construction; walls above are planked. From the northern side there is a balcony supported by four beams and supported by two wooden piers framing the entrance. In the entrance itself are wooden planked doors, the date of construction of the church in the sopraporta. Cupolas, pent roofs covering sacristy and other roofs are covered with metal sheets. Inside wall paintings in the Baroque tradition (1892) with illusionist architectural motives and figures.

27. Greek-Catholic Church in Budynin (Lubelskie Voivodship) view during the preservation works

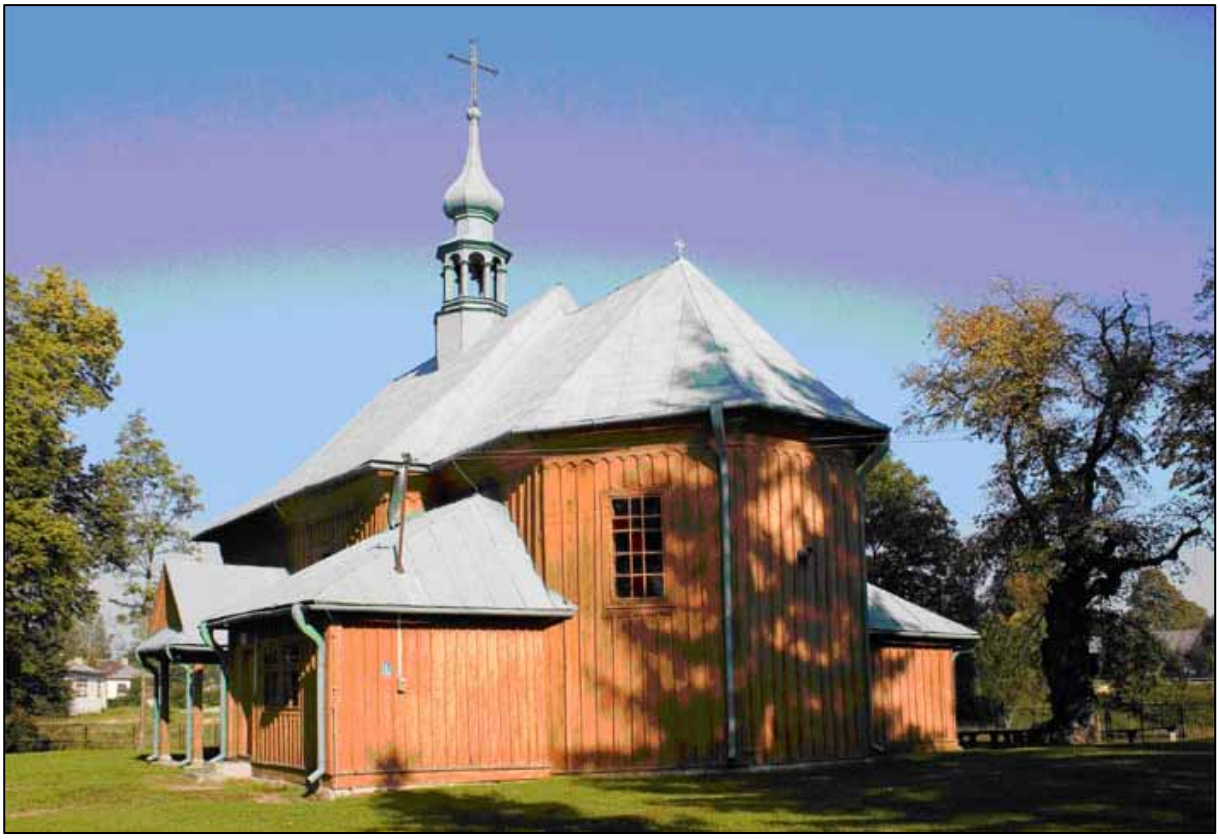
28. Greek-Catholic Church in Budynin (Lubelskie Voivodship) interior with the dome

29. Greek-Catholic Church in Budynin (Lubelskie Voivodship) interior with the view of the iconostas and presbytery

2.10. ŁOSINIEC, GREEK-CATHOLIC CHURCH

Locality: Łosiniec
Administrative division: voivodship: Lubelskie, commune: Susiec
Original Use: sacral, Greek-Catholic (Uniate) Church
Present user: Roman-Catholic Church
Time of Origin: 1731 or 1692, wooden bell-tower 1st half of the 19th c.

The church of Protection of St. Joseph and St. Michael the Archangel [cerkiew Opieki św. Józefa i św. Michała Archanioła] was built during the existence of the Uniate parish and was funded by the magnate Zamoyski family. In 1875 it was transformed to an Orthodox one. In 1919, it was reconciliated (consecrated by the Jesuits; the vocation of St. Joseph was added to the original St. Michael one). In 1935 there was a change of a tower from a Byzantine - like to the one existing until the present day. Next to a church in Horodło, this is the only one Eastern church in the Lubelskie voivodship without a copula. It has a two-part plan, with a small vestibule; it is oriented, built in blockwork construction, with external planking with laths and arch moulding, on a brickwork, partly cemented basis. Nave is rectangular, narrower presbytery is closed triangularly, from the north and south there are two sacristies. On the western side there is a vestibule with a small porch supported on four columns; two smaller porches based on two posts each are at the entrances from the southern and the northern side. Inside flat ceilings, before 1974 finished with plywood. Choir supported on two wooden columns with profiled parapet beams. Entrance and window apertures are square, western entrance with a cable moulding. Saddleback roof covered with sheet metal, over presbytery a lower hipped roof with three surfaces, as is the case of sacristies. Below the eaves of porches, cornices with motives of cable moulding and geisipodes. The late Baroque main altar (18th c) with sculptures of the Apostles St. Peter and Paul and two angels in the portico; there also an icon of St. Mary with the Child, probably from the 1st half of the 18th c.; painted font from 1919. Bell-tower probably from the 1st half of 18th c, in post-frame construction, with planking, laths and arched moulding.
The analysis of the data gathered in this survey shows clearly that the most endangered structure is the church in Miękisz Stary, which remains under the jurisdiction of the Podkarpackie Voivodship Monument Conservator [Podkarpacki Wojewódzki Konserwator Zabytków]. The initial investigation showed that the structure is also quite a specific and unique one – in the light of its architectural, constructional and artistic values. That is why the very structure was selected for the further stage of the research.



30. Greek-Catholic Church in Łosiniec (Lubelskie Voivodship) view from the east

31. Greek-Catholic Church in Łosiniec (Lubelskie Voivodship) bell-tower
32. Greek-Catholic Church in Łosiniec (Lubelskie Voivodship) interior with the view of the presbytery

3. Methodology

The research team decided to proceed according to the methodology that consists of full historical, artistic and architectural research of the status quo, and also of construction research that helps to diagnose the church's state and the degree of destruction. The project aims at finding proper solutions for technical renovation, regulation of function and of the legal status. In discussion with the national monument conservation service it became clear that it is advantageous to propose a complete architectural, structural and environmental project of restoration of the church in Miekisz Stary , along with the cost evaluation. This will be the basis to receive a building permit and a permission from the Conservator. Having obtained the above permits, the local authorities will be able to apply for financing which is necessary to save the unique building.

3.1.

The preliminary visit on site was held in June 2006 and it confirmed the endangered condition of the former Greek-Catholic church in Miękisz Stary. The structure remains unprotected from the access of the third parties and the devastated interior is highly endangered by the climate conditions.
It was confirmed that the church has no furnishings and details of the interior apart from fragments of a demolished staircase that led to the choir. Only ca 40% remained of the surface of the original wooden floor. On the walls of presbytery and choir and at the drum of the cupola there are traces of the two-phase wall painting. Outside, parts of the walls up to the height of ca 100 cm are completely destroyed. Higher, planking is also in a bad condition. Metal sheets on the roof are corroded and perforated.
The visit on site was conducted together with Mr Mariusz Czuba, the Voivodship Conservator and his employees and with the head of the local authorities – the commune of Laszki. Following the visit, the first official paper was drawn up by the office of the Conservator, delineating the conservation guidelines for saving the desolate former church. Future uses and potential solutions were discussed.

Within that preliminary stage of the survey, the full photographic documentation (digital) was realized; also the interactive visualization of the church was designed and executed. Its meaning goes beyond a mere documentation, as due to its panoramic construction, the visualization allows for a constant verification of the research. (See appendices). The panoramic pictures were taken on the 3rd of July 2006. The following equipment was used:

Nikon D50 camera with Nikkor AF DX Fisheye; the field of vision = 180 degrees. 6 horizontal photographs were taken, one picture of the ceiling and one picture of the floor. The long exposure time was necessary due to the poor lighting in the interior. F8 aperture (blend) was chosen, the exposure time of 30 sec. Outside the exposure time was ca 1/500 sec., with the F8 blend. With the use of necessary overlaps the spherical panorama (360^{o}x180^{o}) was thus created. The Hugin application was used for the making of the interactive visualization. In the process there was a need to set characteristic points such as for instance an eye of an apostle or a hole in a plank and to position them on one common overlap. The optimization of the photos and equalization of several hundred of points led to reduction of distortion and of chromatic aberration of lenses; the final result is a panoramic view where the proportion of sides is 2:1. After optimization and calculations the panoramic view is sized 4000x2000 px, saved as a .jpg file (each view has ca 1.5 MB), which allows for professional prints. For presentation the state-of-the-art professional equipment was used: panorama viewer SPi-V. Within that method of documentation an experiment was held – an attempt at fitting the iconostas (from archival photos) into the new panorama. To this end, the common points of the historic black-and-white picture and of the current colour panorama were found.
The SPi-V viewer allows to the work on layers; thus a special key was designed to switch on and off the iconostas visualization. The viewer also allows for an unobstructed flow of panoramas; a navigation follows the click on the left button of the mouse. One can also zoom in by pressing the SHIFT and zoom out by pressing CTRL. To exit from the interactive visit to the church in Miękisz one has to press ESC.

3.2.

The parallel research of written sources and iconography took place, as well as a investigation of historical sources in the State Museum of the Łańcut Castle. The demounted iconostas was transferred there as were the furnishings and other elements of the interior. They were evacuated from the desolate church itself in the years 1964-66, and were precisely described in protocols of the Museum archives. Full description was done currently by J. Giemza M.Sc., with a catalogue containing the historical photographic documentation (see attachment).

3.3.

The next phase of the research was the completion of the survey and documentation. Because of methodological reasons two complementing technologies were applied: 1) computer drawings of architectural and structural drawings: plans, sections and elevations done in 2D (Autocad) and 2) measuring of the volume by means of a 3D laser and orthophotographic pictures of characteristic sections.
The 2D architectural survey was made by a group of students of the Faculty of Architecture, Cracow University of Technology, under guidance of licensed architects – members of the Faculty – and was verified by the project leaders (see attachment).
It consists of 16 drawings:

01 - Situation	scale 1:500
02 – Plan of the level 1	scale 1:50
03 – Plan of the level 2	scale 1:50
04 – Plan of the level 3	scale 1:50
05 – Plan of the roof frame	scale 1:50
06 – Plan of the roof	scale 1:50
07 - Elevation - western	scale 1:50
08 - Elevation - eastern	scale 1:50
09 - Elevation - northern	scale 1:50
10 - Elevation - southern	scale 1:50
11 - Section through presbytery	scale 1:50
12 - Section longitudinal	scale 1:50
13 - Section through nave (presbytery view)	scale 1:50
14 - Section through nave (choir view)	scale 1:50
15 - Section through choir	scale 1:50
16 - Section through women's porch	scale 1:50

The 3D measurements and survey were taken by the team of the National Centre for Research and Documentation of Monuments [Krajowy Ośrodek Badań i Dokumentacji Zabytków] in Warsaw, who accepted the invitation to participate in this project. Systems of digital photogrametry and 3D laser scanning were applied (see appendix).
The scans of the structure were realized in order to verify the conventional 2D survey and on their basis a spatial model was constructed. This model is not only a precise structural and architectural documentation but also it serves the correction of photogrametric works.
Laser scanner Cyrax 2500 was used along with the Cyclone software. Cyrax operates on the basis of exact remote sensing, non-reflection measurement of distance and deviation of the laser beam. The accuracy of the survey is +- 3 mm. In case of the recommended distances within the range of 1,5 – 50 m and the laser spot of 6 mm the accuracy is ca 4 mm and 12". The spatial model, constructed of hundreds of thousands of points is analyzed and reworked in the CAD – CloudWorks application. In this environment the sections and linear drawings are done.

Photogrametric works were done on the basis of a series of photographs. Two digital cameras were used: Canon 20D and Nikon D10. Series of angular pictures of each wall were taken. In order to ensure that the process of calibration (that is to define and eliminate the constant distortion of camera's optics) is successful, each picture was taken on a defined focal axis. Pictures were used as a point of departure to generate orthophotoplans of each wall, utilizing software such as Photomodeler 5 Pro and WiseImage. The coordinates were constantly checked at the 3D laser scans. The last stage in production of the orthophotoplan was the export of graphics files to the external editing software (Adobe Photoshop CS) and equalization of colours and tones.

3.4

The structural report is the integral part of the comprehensive survey. It was executed by the team led by Prof. Jerzy Jasieńko. Next to the diagnose and evaluation of the status quo the report contains the guidelines for the design of conservation of the church as well as adequate detailed technical and technological structural solutions (see attachment).

3.5

A licensed geodetic engineer was commissioned to complete the site plan along with nivelation as well as excerpts from the official property records. These materials are indispensable for the design of conservation and restoration of the church.

4. Description

4.1 General information

GREEK-CATHOLIC CHURCH IN MIĘKISZ STARY

Locality: Miekisz Stary
Administrative division – voivodship: Podkarpackie, commune: Laszki
Owner: Roman-Catholic parish of Miękisz Stary
Original Use: sacral , Greek-Catholic (Uniate) church
Present User: the building is unused; remains desolate
Time of Origin: 17th c., 1885, 1893, 1916.

4.1.1 Technical data:

Volume: ca 935 m^3
Usable surface: ca. 147 m^2
ca. 74 m^2 choir and attics
Total ca. 221 m^2

4.2 Historical and architectural description (by J. Giemza)

4.2.1 Situation

The Greek-Catholic church of the Protection of the Purest Mother of God [Pokrowy Przeczystej Bogarodzicy] is situated in the centre of the village of Miękisz Stary, on a hill, south from the road Laszki - Tuchola.
The sanctuary is oriented; the structure is surrounded by the old trees. Right by the eastern wall of the church there are two sandstone tombs and slightly further there is a large tomb with a Christ's figure. Until 1976 on the axis of the church, from the eastern side, there was a detached bell-tower in a post-frame construction.

4.2.2 History

In the charming Chronicle of the Village, kept by Jan Mikutra of Miękisz, one reads the following: „ In the times of serfdom, and that was in the year 1605, master Mikołaj Miękicki came to our lands with his slaves. One part of them were Ukrainian and the other part were Polish. They were 30 people. He gave them land , as much as was necessary and from this land they had to work in serfdom. From one hectare of land they had to work on his lands for one day [a week]. In exchange a peasant would not pay the property tax and the cattle tax. After some time he brought 20 slaves more so that there were 50 houses. And he also gave them land so that they could support themselves. 10 years later they built a Greek-Catholic church, because there were more Ukrainians. The church was wooden, covered with shingle and two porches and one bell-tower with three bells. In 1901 it was renovated and covered with metal. Poles would go to the church in Laszki, in the times of the Reverend Dean Ludwik Bikowski, who was the first vicar in Laszki from 1890 to 1910. He was a very good priest. He bought in Miękisz 0,2 *ar* [0,02 ha] of land from Wojciech Piguła for the Church Brotherhood and a house in Duńkowiczki for the nursery. Children learnt

there and there was also a little shop. There was no one in the village who could give three *morgi* [ca 1,8 ha] of land to maintain the nuns so the nuns walked for 10 years from Miękisz Nowy to teach our children. They taught three grades and religion. It was from 1899 until 1910. I, Jan Mikutra went to this school. I learned to read and write ". The above text is not only a description of historic events but also an evidence of the persisting local historical tradition, first oral and then written.
As to the church itself, in the vicinity there are the tombs of two families: Zajączkowski and Yunga. The Greek-Catholic church has many stylistic strata and was rebuilt many times. The oldest (17th c., probably) part is the blockwork construction of the sanctuary, to which in 1811 (?) the nave and women's porch were added. Most likely then the elliptical, Neo-baroque vault of the nave was also added, with a new roof frame crowned by a lantern. Also illusionist wall paintings, images of Evangelists on the drum and Angels playing music on the balustrade of the choir were added. In 1883 shingles were replaced by sheet metal covering (date on the ridge turret). Sacristy and porches enriched the volume. In 1885 wall paintings were completed (images of the figures of the Good Shepherd – Conscience and the Return of the Prodigal Son – Father I Have Sinned at the walls of the women's porch; Angels announcing the Judgment Day - at the ceiling.) The founding inscription, now incomplete, in Ukrainian language had it: "This church was built in 1880 under the protectorate of Jan Czyrnieński, due to the efforts of Jan Furczyna and Wasyl Halas, and it was painted in 1885" – and referred actually to the renovation works. The church was also renovated after the damages of the World War I. According to the local tradition the works were done by a Jew of Radymno. In the years 1872-1947 the church was a branch of a parish in Miękisz Nowy. Since the time of deportation of the ethnic Ukrainians the temple remains unused. The bell-tower in post-frame construction was completely destroyed in 1976. In the year 1989 the provisional protection measures for the church were taken, however the physical existence of the monument is still endangered.

4.2.3 Structural description

Wooden trigeminal Greek-Catholic church in blockwork construction. Rectangular nave 760x840 cm with the axial sanctuary from the east, triangularly closed, 765x555 cm, and the rectangular women's porch from the west 360x550 cm. Rectangular sacristy adjoining the nave from the north, 345x315 cm. Two rectangular porches adjoining the women's porch [babiniec] - 220x150 cm from the north along the nave and 285x345cm from the west.

The immediate corner-joining connection of the sanctuary with the nave is lacking (beams embedded in columns). Sacristy in blockwork construction added from the north in the same manner. Two porches in post construction were adjoining the women's porch [babiniec] from the north and west. Wooden sill , profile 24~25x31-35 cm (w in sacristy and porches 20,5-22 x 21-25 cm) , corner-joined. Beams (logs) of the walls of coniferous wood, 14-15 cm thick , 12 cm in sacristy. Slender beams [brusy] in the sanctuary walls with tenons; in the nave and women's porch – with dovetails. Sills of the three principal spaces of the church were supported on large stones. Later a brickwork base was added. Northern wall of the nave and drum stiffened by two anchors tightened with iron bolts. Parallel solution on the south. Walls of porches made of planks joined to sills and collar beams.
Nave crowned by octagonal drum with planking in the corners; elliptical cupola constructed of boards, nailed to arches mounted to the roof frame, with octagonal lantern of four windows. Anchors at the base of the cupola. Sanctuary closed by the barrel vault made of planks, nailed to arches mounted to the floor beams. In the women's porch flat ceiling built of boards nailed to internal floor beams. In sacristy flat ceiling nailed to external floor beams. No ceilings in porches. Roof frame above the nave is not wholly identifiable. Conical shape of the roof, hipped with eight surfaces, lantern with the onion-shaped ridge turret. Roofs above sacristy (one-ridged, hipped, with 5 surfaces) and women's porch (saddleback) in rafter construction with span-pieces. Saddleback roofs over sacristy and western porch, over northern one – pent roofs. All roofs covered with iron sheets. Date "1863" painted on the ridge turret. Turret crowned by a large wrought iron cross. Smaller ones on the gables.
Walls sided with vertical planking with overlaps and laths. In the women's porch a musical choir supported on two beams; front one supported on four columns (one missing). In the western and northern wall traces of stair construction. Balustrade made of vertical planks mounted to the lower beam and the parapet beam. Openings between main spaces slightly slanted in upper corners. Upper part of the opening between nave and sacristy partly screened by planking. Floor of wooden planks pegged directly to the joists laid immediately on sand. Level in sanctuary 14 cm higher than in the nave. Northern entrance to the nave, rectangular, blinded, 200xl05cm. Western entrance to the women's porch , 208x126cm, doors of planks. Wrought iron staple. Northern entrance to women's porch, 190x102cm, plank doors, wrought iron hinges and a massive iron lock. Two windows 118x80cm in the south wall of the nave, one in the north one, with frames 19 cm. Two windows in the south wall of the sanctuary, one from the north, 104x85cm, frames 16 cm. Similar windows in the women's porch (north and south) and two windows cut in the western wall, 70x50. Windows in the drum 70x45cm, frames 15 cm. Wrought iron grates.

4.3 Technical state:

State of preservation:
-destruction of the foundation and sill -ca. 70%
- destruction of the blockwork wall construction - ca.30%
- destruction of external planking - ok. 50%
- destruction of floors- ca. 50%
- destruction of windows - 100%

- disrepair of wall paintings - ca. 40%
- destruction of roof structure - ca 20%
- ceilings attacked by insects
- leaking roof covering

5. Conclusions

The architectural monument in question might still be saved, however under condition of the immediate intervention. Such an intervention shall consist of the following steps:

- Protecting of the now accessible interior from trespassers
- Supplementing of the missing covering of structural elements that are now exposed to climate
- Taking of administrative decisions to define the formal and legal status of the building
- Elaboration of a complete documentation (architectural conservation design) that allows for obtaining of a building permit as well as a permission from the state conservation service and preparation of an application for financial means to implement the project
- Promotion and public support

6. General guidelines and perspectives

Complex documentation and complex renovation works preserving all the historical strata shall be the basis for the vision of the future use of the building. Moreover the following shall be taken into consideration:

- Full conservation of wall paintings as well as taking samples in order to search for possible older strata in the area of the sanctuary
- Reconstruction of the 17th c bell-tower based on the iconography (picture taken in 1964 showing the bare post-frame construction with the measuring scale) and on analogous structures , or transfer of a bell-tower from elsewhere
- In case of taking over of the building by a permanent user – for religious purposes or as a branch of a museum – the retrieval of the original furnishing and elements of the interior (entire or parts thereof). These are currently kept in the Department of the Eastern Church Art (former Voivodship Store of Historic Commodities) in the Museum of the Łańcut Castle. Conservation of tombs of the Yunga and Zajączkowski family.

7. Guidelines for conservation

7.1 Conservation – urban design guidelines

The Greek-Catholic Church in Miękisz Stary is oriented and situated on a small hill of a triangular shape, at the crossroads; roads lead to Lubaczów, Jarosław and Przemyśl.
From the west the upper edge of the hill rises ca 2 m above the road nivelation, and the height diminishes to ca 1 m from the east. Edges of the hill are natural borders of the prospective zone of strict protection that will surround the building itself, old trees and monuments and tombstones that occupy the south-eastern part of the hill. A fence of rather low segments of stonework and wood (not exceeding 1 m in height) is proposed. It will consist of repetitive modular elements – small piers of the local stone laid in rustic manner and of horizontal wooden beams of small profiles [brusy] , covered by shingle. The project proposes recultivation of greenery along with the lawn, correction of brims and ordering of the church cemetery. Stairs and paths leading to the entrances (laid with flat stones) as well as external illumination will be built.

7.2. Conservation – architectural guidelines

Finding of an adequate function, ensuring proper conditions of use, maintenance and management remains the basic problem in case of this historic structure.

7.2.1 Guidelines for conversion of the former church

Members of the former Greek-Catholic community of Miękisz Stary have left their homeland – as a consequence of the last World War - and the current inhabitants, who belong to the Roman-Catholic parish, have built a new church. Therefore, given the preliminary discussions with the local authorities (Office of the Commune in Laszki) as well as with the Voivodship Monument Conservator, the project foresees the foundation of a local Commune Centre of Education and Culture [Gminne Centrum Edukacji i Kultury]. The immediate vicinity of the newly built school, centre of education itself, enhances this prospect.
Therefore the building might be used as a multi-purpose hall (nave) with the exhibition devoted to its history in the annex (women's porch). After the restitution of the iconostas it could moreover function as a museum of the Eastern church art (presbytery), which would be adequately protected and could also serve as a small conference hall for ca 20 persons and as an ecumenical chapel. The volume of the nave allows for placement of ca 50 seats as well as a small podium in front of the iconostas. Automatic screens for multimedia presentations and necessary services shall be concealed in the floor.

7.2.2 Guidelines for protection

- Ordering of the immediate surroundings of the church (as described in 7.1.)
- Strengthening of the structure (as in 7.3.)
- Conservation of wall paintings, following the research of painted surfaces conducted in order to delineate the technological programme of conservation
- Reconstruction of the floor, taking into consideration all the functional and technological needs (as in 7.2.1.)
- Restitution of the typical shingle covering and external planking as well as exchange of the copper covering of the ridge turret and rain gutters, drain pipes; new drainage (as in 7.3.5.)
- Reconstruction of the main and side porches with their furnishings and architectural details
- Reconstruction and restoration of windows and doors with their framing and ironwork
- Reconstruction of the iconostas currently stored in the collection of the Department of the Eastern Church Art in the Museum of the Łańcut Castle

7.3. Guidelines and proposed solutions for the conservation of the structure

The structural research of foundations, walls built in blockwork construction, floors, cupola above the transept and roof frame was conducted, featuring the defining of the structure's deformation, sinking of the foundations, state (density) of the wooden structural elements and the level of their biological and technical corrosion. The following solutions were proposed:

7.3.1. Foundations

New concrete foundation under the porches was designed (in the underground part), located at the depth of 120 cm, because of the local freezing conditions. The brickwork pediment above the ground remains, however its surface shall be conserved by means of mineral putties and lime mortars. The whole pediment will undergo hydrophobisation. The above solutions are based on the technology supplied by REMMERS. Around the church a new strip drainage will be introduced, with PVC drains and six basins in the technology supplied by REHAU.
Moreover, around the church a strip of granite cobbles (11x11 cm) was designed, 80 cm wide, laid on dry sand and cement bed, with basalt gravel joints. Slope 2 %.

7.3.2. Walls in blockwork construction

The structural elements of walls in blockwork construction shall be retained as far as possible because of the wall paintings on their inner surfaces. Technical state of the sills however demands that they shall be completely exchanged – for sills of oak wood C30. Insulation of tar paper on the brickwork pediment under the sills.
The research has shown that the wood of six lower beams is in a bad condition and that they can not be used as continuous beams; exchange of corroded fragments proves to be indispensable. The beams shall be removed from the structure and their parts shall be exchanged for elements of new pinewood with the use of the cast iron rings GEKA (D80) and steel bolts ø18mm (3.) with the overlap. In case of the wall painting existing on the beams that need to be exchanged, the painted parts shall be cut away (ca 3 cm deep) from the beam and conserved by impregnation with the compound on the basis of epoxy resins, then glued anew. Destructed corner joints shall be exchanged. Lower beams in blockwork construction shall be reintroduced after conservation, with the traditional use of pegs in the longitudinal direction; the lowest (first) beam will be joined with the sill by wooden blocks. Temporary structure was designed to support the perimeter walls and transept during the exchange of beams.

7.3.3. Roof structure, covering

Shingle covering is to be reconstructed. Beech wood shingles, cut [łupane], 8 mm thick, 12cm wide, 30 cm long on laths 5 x 6 cm. Membrane foil laid underneath.
Conservation of structural elements of the roof frame (posts, rafters, span-pieces, laths, floor beams etc.) is to be conducted through supplementing with the new fragments of pinewood C30, with joints by GEKA rings and bolts.
Strengthening of structural joints against planar deformations will follow through the exchange of certain pegs for oak wood headed pegs and through supplementing the sections of fractured or loosened joints by means of fragments of the recycled wood.
The exchange of the perimeter ring of the cupola (which remains under tensile stress) over the crossing of the transept and the nave was designed. Due to individual design solutions of joints the demounting of the cupola is not necessary. Pinewood C30 was used.

7.3.4. Floor and wall planking

The demounting of the existing floor was advised, as was the conservation and later mounting of the original elements. The missing boards will be supplemented by new boards. The floor was designed as the traditional „white" floor of the broad larch wood boards impregnated by the colourless preparate Fobosem 2M, waxed with natural wax on both sides, in SPEKVA or REMMERS technology. Joists shall be conserved by supplementing and impregnation with preparates such as FOBOS 2M and SADOLIN. Joists are to be laid on brick

piers positioned on the foundations in order to maintain the existing floor level. The existing sand bed was preserved. Ventilation openings ø 60mm are foreseen in the brick pediment for the air exchange in the space below the floor. The existing external planking shall be demounted, corroded elements are to be removed and replaced by new pinewood planks; the uncorroded ones are to be conserved as above and mounted anew along with the new pinewood.

Final Remarks

- The research has shown that the existing deformation does not pose a danger to the statics of the structure. Therefore the designers chose not to eliminate this deformation during the conservation process. Stiffening of the structure will be achieved by partial exchange of certain elements of the structure and above all through the repair and strengthening of joints.
- After the conservation, the entire wood of the church shall be impregnated by a tri-functional preparate OCEAN 441-Z (against biological corrosion and fire), and later it shall be treated with colouring impregnates on a water basis and waxing in REMMERS technology.

7.3.5. Services

Following services were designed:

- Lightning protection installation
- Drainage
- Internal electrical installation (including heating)
- External and internal illumination
- Security monitoring and smoke detection
- Fire protection, based on FOG, the original Polish method of „water fog".

Notes:

1. L. Dietriechson „De Norske stavkirker", Krystiania 1890
2. T. Dobrowolski „Najstarsze drewniane kościoły śląskie jako znaki zamierzchłej przeszłości", Zaranie Śląskie, Katowice 1946, p. 17
3. R. Brykowski *Drewniana architektura kościelna w Małopolsce XV wieku*, Wydawnictwo Ossolineum, Wrocław 1981
4. M. Kornecki *Kościoły drewniane w Małoplsce*, Wydawnictwo ODZ w Warszawie, Kraków 1999
5. M. Kornecki, op. cit., p. 31
6. R. Marcinek, Z. Myczkowski „Wśród cudów świata", *Wiadomości Konserwatorskie* nr 13/2003, Warszawa 2003
7. R. Brykowski, *Drewniana architektura kościelna w Małopolsce XV wieku,* PAN, Wrocław 1981
8. R. Brykowski, op. cit. p. 111;
9. R. Brykowski, op. cit.
10. M. Skowroński *Cerkwie Nadsania. Przemyśl – Leżajsk*, Wydawnictwo Fundacja s.c. Nowy Sącz 2005;
11. F. Kiryk, F. Lesniak ,Skupiska żydowskie w miastach małopolskich do końca XVI wieku" w: *Żydzi w Małopolsce*, Przemyśl 1991, str.15
12. Exhibition catalogue „Zniszczone – Ocalone Dziedzictwo", by Fundacja Dobro Kultury i Stowarzyszenie Konserwatorów Zabytków, 2005 .
13. M. K. Piechotkowie *Bramy Nieba- Gates of Heaven* , Wydawnictwo Arkady, Warszawa 1999
14. M. Skowroński, op. cit.,: from 119 structures that existed in 1944 only 70 persisted until the present day (8 in ruin).

Sources of illustrations:

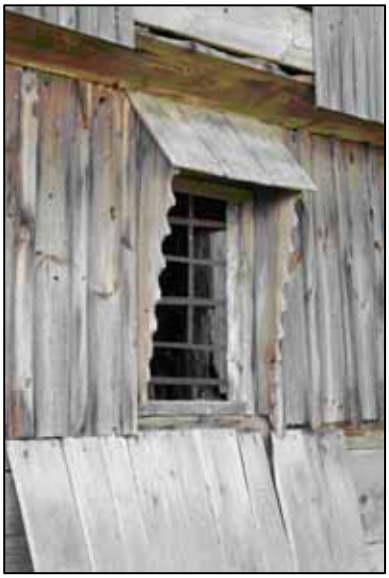
- Photographic documentation, PP PKZ Warszawa, 1964-1968;
- Archives of the Department of the Eastern Church Art in the Museum at the Łańcut Castle. *Dokumentacja wizytacyjna z lat 1960-2000, T. I-IV*. Dział Sztuki Cerkiewnej Muzeum Zamku w Łańcucie;
- Archiwum SOZ w Przemyślu, *Evidential card of the Church in Piątkowa*, oprac. J. Giemza
- *"Miejscowości Gminy Laszki na przestrzeni wieków"* Grzegorza Kubala
- J. Mazur, „Drewniane cerkwie Złotego Wieku", in: *Monument, studia i materiały Krajowego Ośrodka Badań i Dokumentacji Zabytków,* no. 2 / 2005, Warszawa 2005, p. 71
- T. Śledzikowski, „Małopolskie kościoły drewniane na Liście Światowego Dziedzictwa Kulturalnego i Naturalnego UNESCO" in: *Monument, studia i materiały Krajowego Ośrodka Badań i Dokumentacji Zabytków,* 2 /2005, Warszawa 2005, p. 143

8. Bibliography

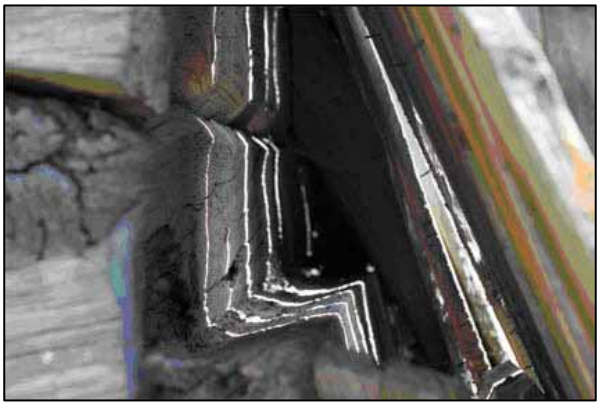
- *Szematyzmy duchowieństwa grecko-katolickiego z lat 1877, 1879, 1927, 1936, 1938-39;*
- *Losy cerkwi w Polsce po 1944 roku,* Rzeszów 1997;
- Blazejowskyj D., *Historical sematism of the eparchy Peremysl including the Apostolic Administration of Lemkivscyna (1828-1939)*, Lviv-Kamenyar 1995;
- Iwanusiw O., *Cerkwa w rujini. Church in ruins*, Toronto 1987
- Kołbuk W., *Kościoły wschodnie w Rzeczypospolitej około 1772 roku*, Lublin 1998 (see detailed informations on sources and literature);
- Saładiak A., *Pamiątki i zabytki kultury ukraińskiej w Polsce*, Warszawa1993;

Translated from Polish by Marta A. Urbańska, Phd. Arch.

The Church of Miękisz Stary: Photographic Documentation



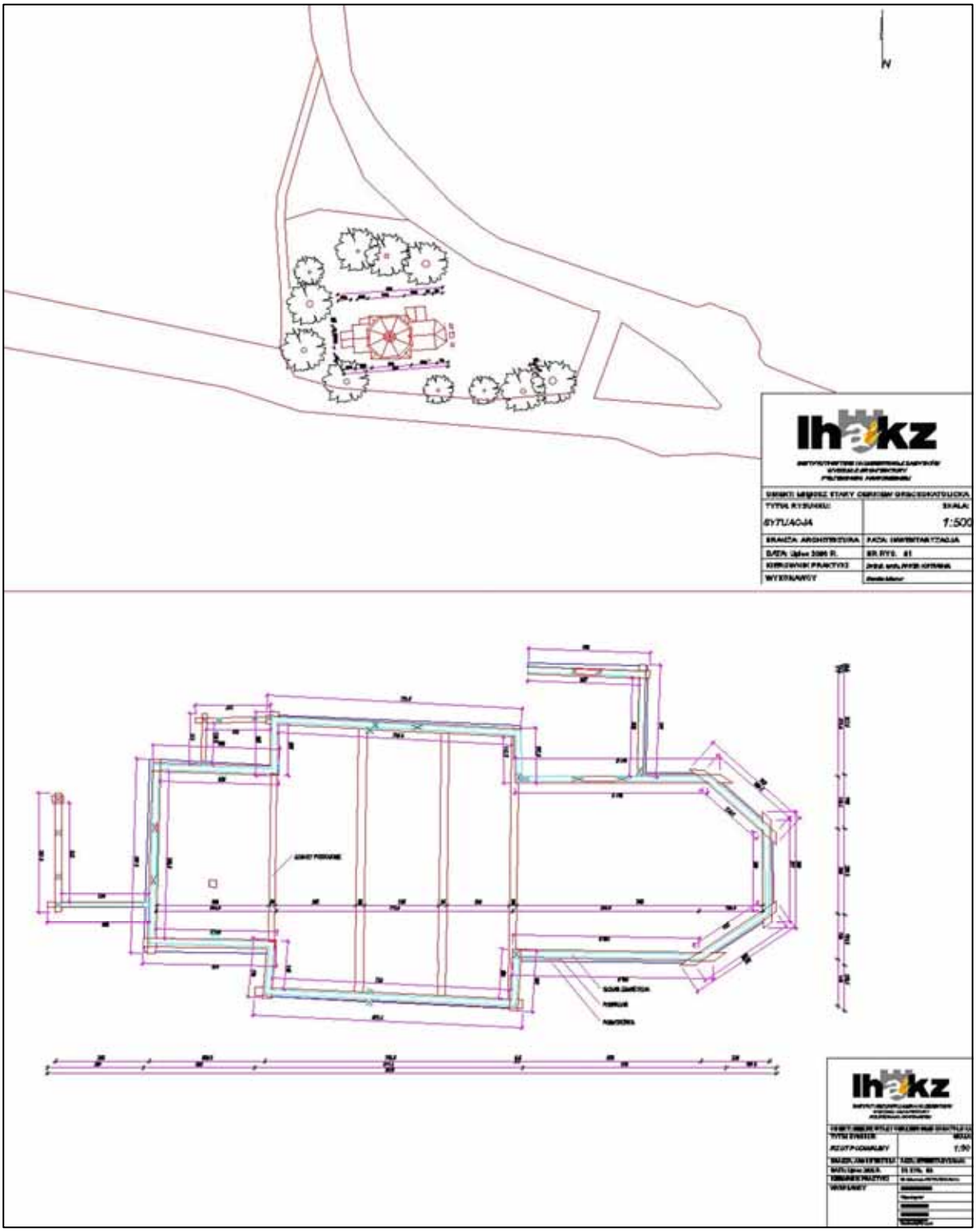




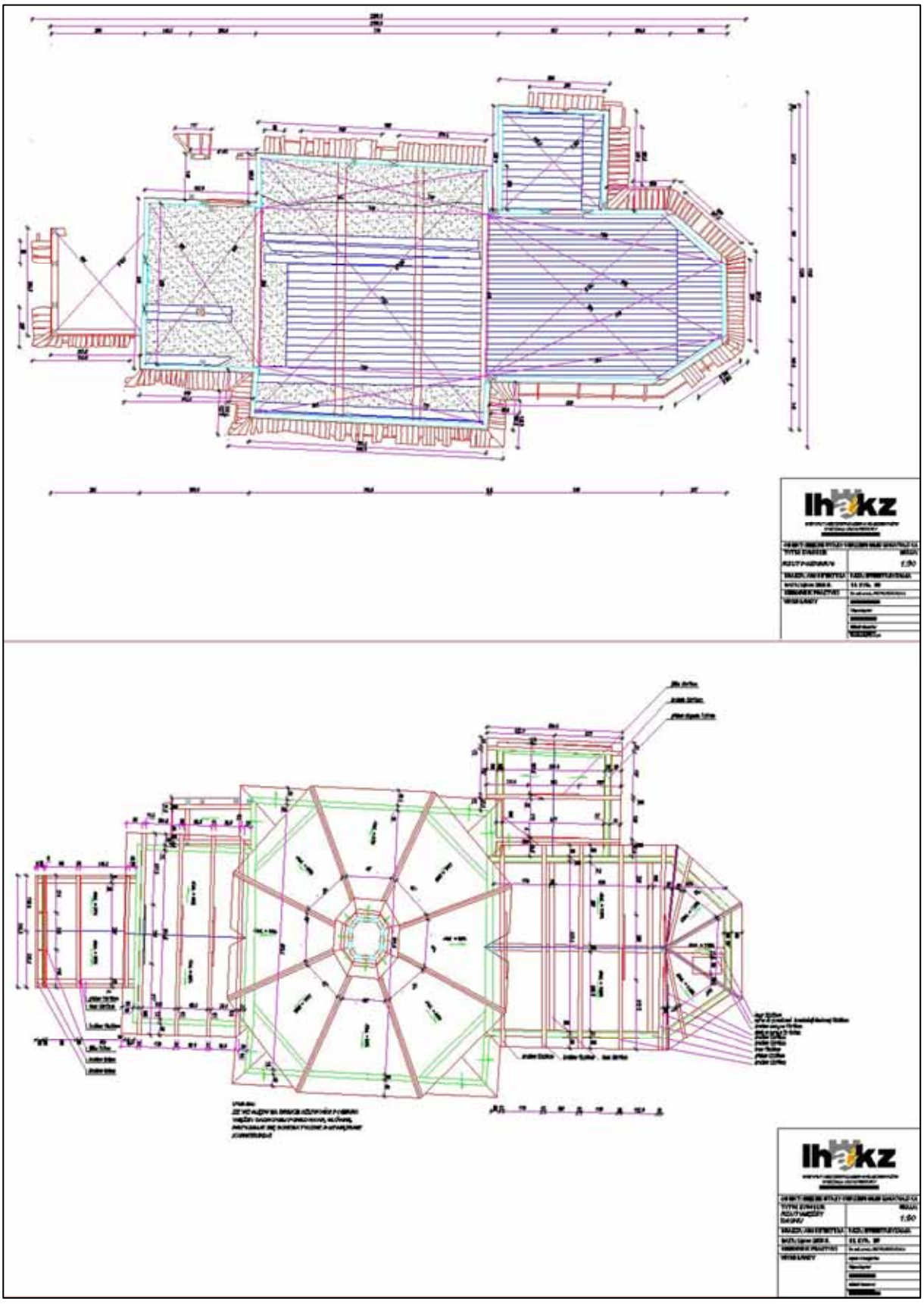



The Church of Miękisz Stary: Drawings

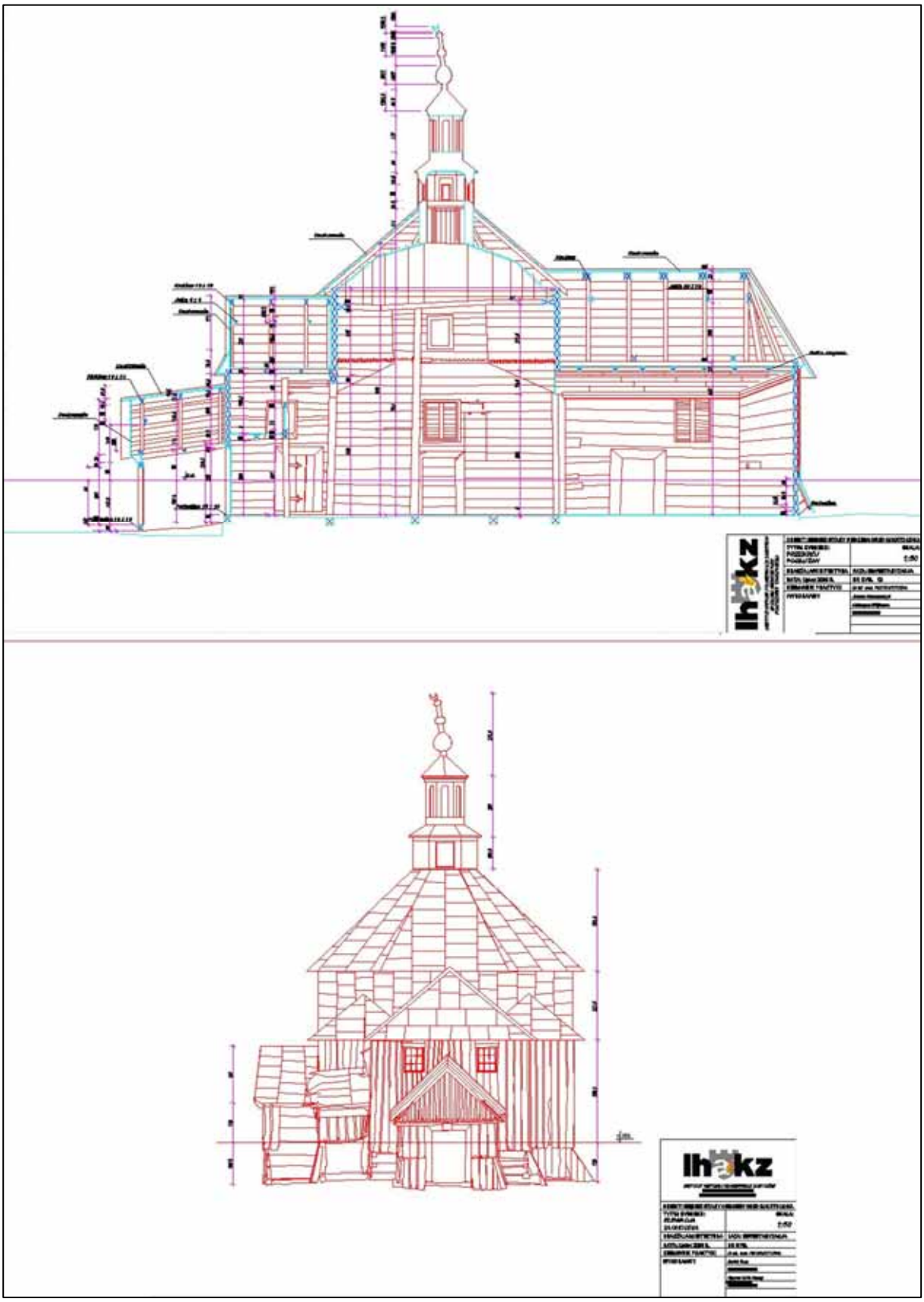
1. Site plan **2.** Plan of the basement



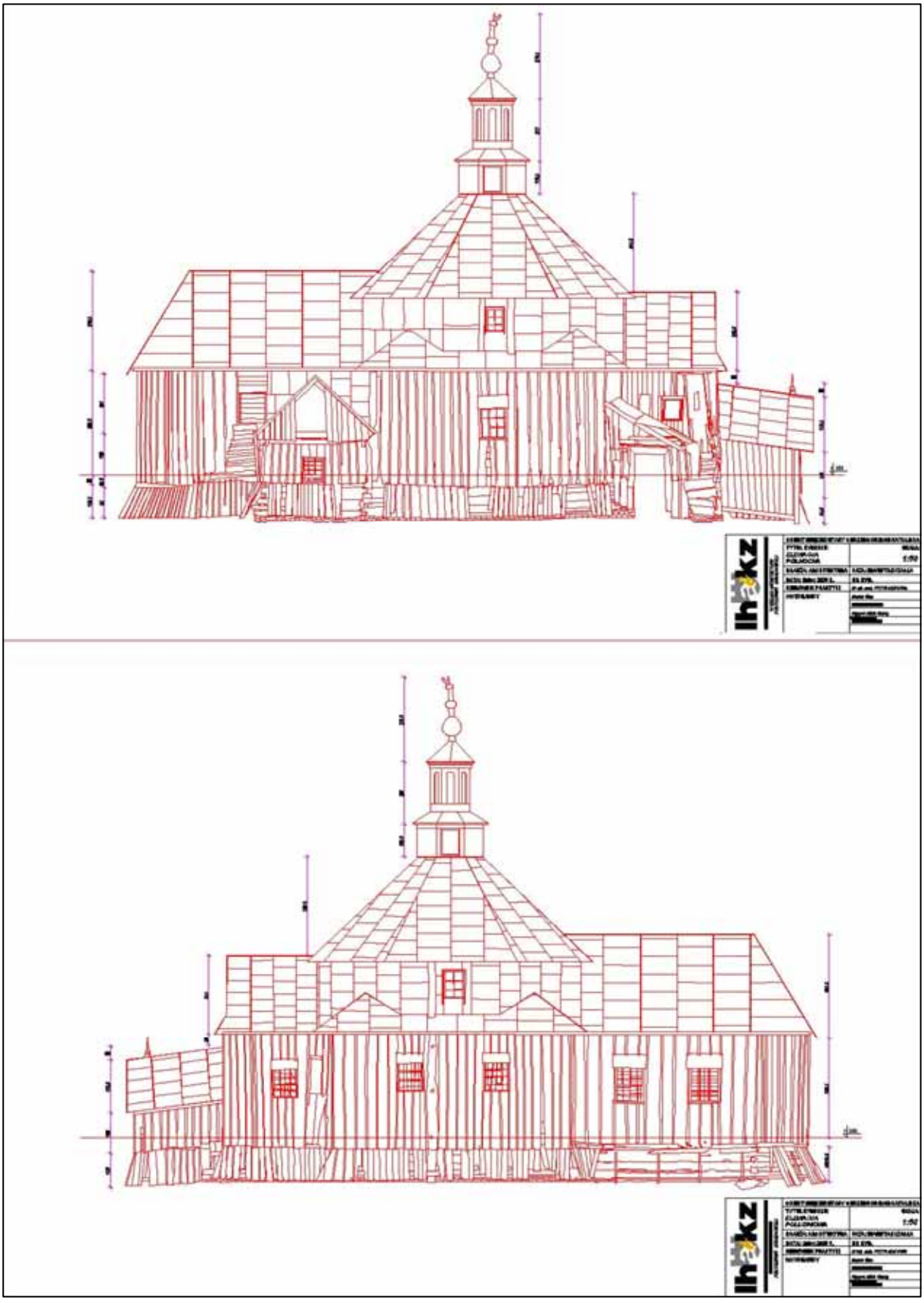
3. Floor plan
4. Plan of the roof frame



5. Longitudinal section
6. Front elevation (west)



7. Side elevation (north)
8. Side elevation (south)



POLAND

Faculty of Architecture, Cracow University of Technology

CURRICULUM VITAE

Andrzej Kadłuczka

Born in 1943 in Cracow, diploma and internship at the Faculty of Architecture of the Cracow University of Technology in 1966; teaching experience at the Chair of the History of Polish Architectutre. Doctorate and Associate Professor [adiunkt] at the Institute of History of Architecture and Monument Preservation, Faculty of Architecture, CUT; Doctor of Science degree in 1983, Professor in 1995, since 2000 Full Professor [Professor Ordinus] at the Cracow University of Technology.

1986 – 1993 Deputy Dean, 1993 – 1999 Dean of the Faculty, currently director of the Institute of History of Architecture and Monument Preservation. In 1983 scholarship at the Department of Antiquities in Cairo; later lectures in architectural schools in Munster, Venice, Delft, Budapest and Zagreb. Author of over a 100 publications, papers, manuals, books and essays, conceived and organized the International Conference on Conservation which resulted in the acclaimed „Cracow Charter 2000".

Author and co-author of numerous designs and realized projects in conservation, among others: complex of the Armenian burgher houses and Arsenal in Zamość, church of St. Salvator in Cracow, reconstruction of the monument of the battle at Grunwald in Cracow, modernization and restoration of the Słowacki Theatre in Cracow. In 1989 he founded his own architectural studio, known since in 1994 as ARCHECON, which realized numerous large scale design projects as well as built projects, such as: Music Academy in Cracow; conversion of the former King's Palace at Łobzów for the Faculty of Architecture; modernization of the Old Theatre [Teatr Stary] in Cracow; Sheraton Hotel and housing estate for the CPN corporation in Cracow; restoration of the Carmelite Church and King's Kazimierz Castle in Przemyśl; numerous commercial and residential projects as well as – recently – prestigious commissions such as modernization of the Main Market Square, revalorization of the Church of St. Adalbert, modernization and restoration of the Cloth Hall – all in Cracow.

Member of numerous scientific organizations, both foreign and national:

Polish Academy of Sciences PAN O/Kraków (1985, also member of Presidium of the Committe of Architecture and Urbanism), PNC ICOMOS, Polish Section of DOCOMOMO (Documentation and Conservation of Modern Movement Working Party), Polish Centre of OISTAT . Former Chairman of the Board of the SKZ [Polish Association of Conservators] and former V-ce Chairman of PNC ICOMOS. Lincensed expert of the ministry of Culture, member of many forums and councils, laureate of many awards and prizes, among others: Prize of the City of Cracow (1987), Prize of the Minister of National Education (2001), Award of SARP [Association of Architects of the Republic of Poland], medal of the Committee for National Education (2001), Złoty Krzyż Zasługi [Golden Cross of Merit] and Krzyż Kawalerski Orderu Odrodzenia Polski [Cavalier's Cross of the Order of the Rebirth of Poland] (2001).

Jerzy Jasieńko

Academic qualifications:

Department of Civil Engineering, Technical University of Wrocław: spec.: Building Structures - Master of Engineering - 1977, Doctorate - 1985, Doctor of Science (Habilitation) - 2002.

Experience:

Research Assistant of the Technical University of Wrocław - Lecturer in Civil Engineering Department, Department of Architecture - specialization: Protection of Historical Buildings: Assistant - 1978, Lecturer - 1985, Doctor of Science - 2002.

Teaching experience:

Lectures and classes in: General Building Engineering, Wooden Structures, Repair, Conservation and Reinforcement of Historical Objects - at the Department of Civil Engineering and at the Department of Architecture of Technical University of Wrocław.

Membership in scientific organizations:

Membership in Scientific Committees and Councils -foreign and Polish - among others: Member of Scientific Council of Civil Engineering Department, Member of Scientific Council of Institute of Building Engineering - Technical University of Wrocław. President, Association of Conservators of Historical Buildings, Presidium Member of PKN ICOMOS (Polish National Committee, International Council on Monuments and Sites), Member and Polish Representative, with a vote constituting ISCARSAH-ICOMOS (International Scientific Committee for Analysis and Restoration of Structures of Architectural Heritage - International Council on Monuments and Sites),

Member of IABSE, Member of Council for Protection of Historical Buildings at Ministry of Culture - for consecutive term of office 2004-2007, Member of Chief Conservatory Commission - vice-president - for term of office 2002-2006, Member of Scientific Council of Institute of Building Engineering - Technical University of Wrocław, Member of Scientific Council of Civil Engineering Department - Technical University of Wrocław,

Member of Section of Wooden Structures - Polish Academy of Sciences, Member of Scientific Council of National Centre for Studies and Documentation of Historical Buildings in Warsaw, Chairman of Council of Lower Silesian Chamber of Civil Engineers.

Scientific research:

On conservation and reinforcement of wooden and brickwork structures using glue joints as well as inserts and steel rods, GR rods, CFRP carbon strips, mats and nets, synthetic resins; decay, deformation and stressing of combined structures; technical state diagnostics of historical structures; conservation programs and projects in the area of historical brickwork and wooden buildings; analytical and numerical modelling of static working of historical structures.

Project and design works:

over 100 building, construction and conservation design projects as well as technical expertise on building objects including historical buildings. Participation in over 50 projects - consultant, verifier.

Over 90 scientific as well as scientific-engineering works/papers published in Polish and foreign periodicals as

well as in conference materials, mainly on: repair, conservation and reinforcement of structural elements of historical buildings, utilization of mechanical and glued joints in restoration of wooden, brick and stone structures, drying and insulating of historical buildings.

Kazimierz Kuśnierz
Born in Cracow in 1948, 1966 – 1971 studied at the Faculty of Architecture, Cracow University of Technology; diploma in architecture in 1971, Doctorate 1982, Doctor of Science degree in 1991; appointed as Professor at the CUT in 1994, received the state title of Professor of Technical Sciences in 1999, Ful Professor at the CUT since 2002. Since 1992 Head of the Division and later the Chair of History of Architecture, Urban Planing and Art at the Institute of History of Art and Monument Preservation , CUT. 1995 – 1999 headed the Institute, in 1999 – 2005 – V-ce Dean of the Faculty of Architecture for Scientific Affairs. He specializes in history of urban planning and architecture as well as in monument preservation; also a lincensed expert of the Ministry of Culture since 1993. Author of 7 books, several hundred publications and scientific papers, promotor of 6 doctoral dissertations in history of urbanism and architecture.

Zbigniew Wikłacz:
Born in Cracow in 1961. In 1981 graduated from the State College of Fine Arts in Cracow. Master of Architecture from the Faculty of Architecture at Cracow University of Technology, 1987. One-year postgraduate studies in the Chair of Computer-Aided Architectural Design, ETH-Zurich, 1993/94.
Professional design license, 1993.
Doctoral degree, 1999.
Since 1988 - teaches fine arts at the Chair of Drawing, Painting and Sculpture at the Faculty of Architecture, CUT. Since 1997 - teaches architectural design at the Institute of History of Architecture and Monument Preservation. Research on use of digital techniques in conservation of historic buildings.
Since 1990 running his own design studio. Author of numerous architectural as well as conservation projects.

Jakub Bil
Jakub Bil was born in Nowy Sącz, Poland. He completed the photography course [Otwarte Studium Fotografii] led by the Faculty of Architecture in Cracow and by Jan Matejko Academy of Fine Arts in Cracow, Department of Intermedia Art.
He also studied at the Jagiellonian University, Department of Eastern Studies , specialization in the Arabic Language; and at the Faculty of Architecture, Cracow University of Technology. Voluntary assistant/trainee at the Institute of History of Architecture and Monument Preservation, Faculty of Architecture, CUT. Winner of the art workshop in Florence (within a group of fine arts students) organized by Fondazione Romualdo Del Bianco. Scholarship at Fondazione Romualdo Del Bianco (graphic art, design), trainee at: architectural and design offices and advertising and art events agencies. Cooperated with design studios (on colour schemes of several buildings and interior design). Organizer, co-organizer or curator of international art exhibitions, art projects, art events. Cooperator of an Italian graphic art foundation.
Active in fields of art such as drawing, graphic art, sculpture, design, interior architecture, architecture, new media. Exhibitions, both individual and group ones, mostly outside Poland. Art works in collections outside Poland, private collections and institutions.

CZECH REPUBLIC

Faculty of Architecture
Brno University of Technology

Report about the Protection and the Conservation Conditions of Wooden Monuments in the Czech Republic

Helena Zemánková, Zuzana Jacková, Bohumil Straka,
Jan Vaněrek, Petr Hradil, Josef Hrabec, Ivana Žabičková
Faculty of Architecture, Brno University of Technology

The research of wooden churches has been conducted within the EU Culture 2000 project entitled "Rescuing hidden European wooden religious heritage: an international methodology for implementing a database for restoration projects" (Project CLT2005/A1/CH/IT-242) in the winter and spring of 2005/2006.

MONUMENT PROTECTION IN THE CZECH REPUBLIC

Josef Hrabec, Studio of Monument Reconstruction, Faculty of Architecture, Brno University of Technology

The monument protection in its institutional form has existed in Czech lands since 1850 when a Central Board for Research and Preservation of Historic Buildings was established at Vienna, the centre of the then Austria. However, it was only after 108 years in 1958 that a law on monument protection came into force. The previous attempts were rejected as interfering with the owners' rights or because of the turbulent war events. The current law dates back to 1987 and is based on the State Monument Protection Act.

Under this law, the Czech monument protection is organized at two levels. The first level is formed by specialized bodies located in the centres of regions with headquarters in Prague. The executive bodies, methodologically controlled by the specialized bodies, are based in district towns and authorized villages (the relevant building authorities and departments). The entire structure is then supervised by the Ministry of Culture of the Czech Republic.

Monument protection is financed from the budget of the Ministry of Culture, however, the funding received is usually not sufficient. As a result, a large number of historic monuments are dilapidated being isolated from the life of society. This is one of the reasons why there are more and more institutions, unincorporated associations, and private monument owners whose activities are funded from the community programmes offered by the European Union (such as Culture 2000).

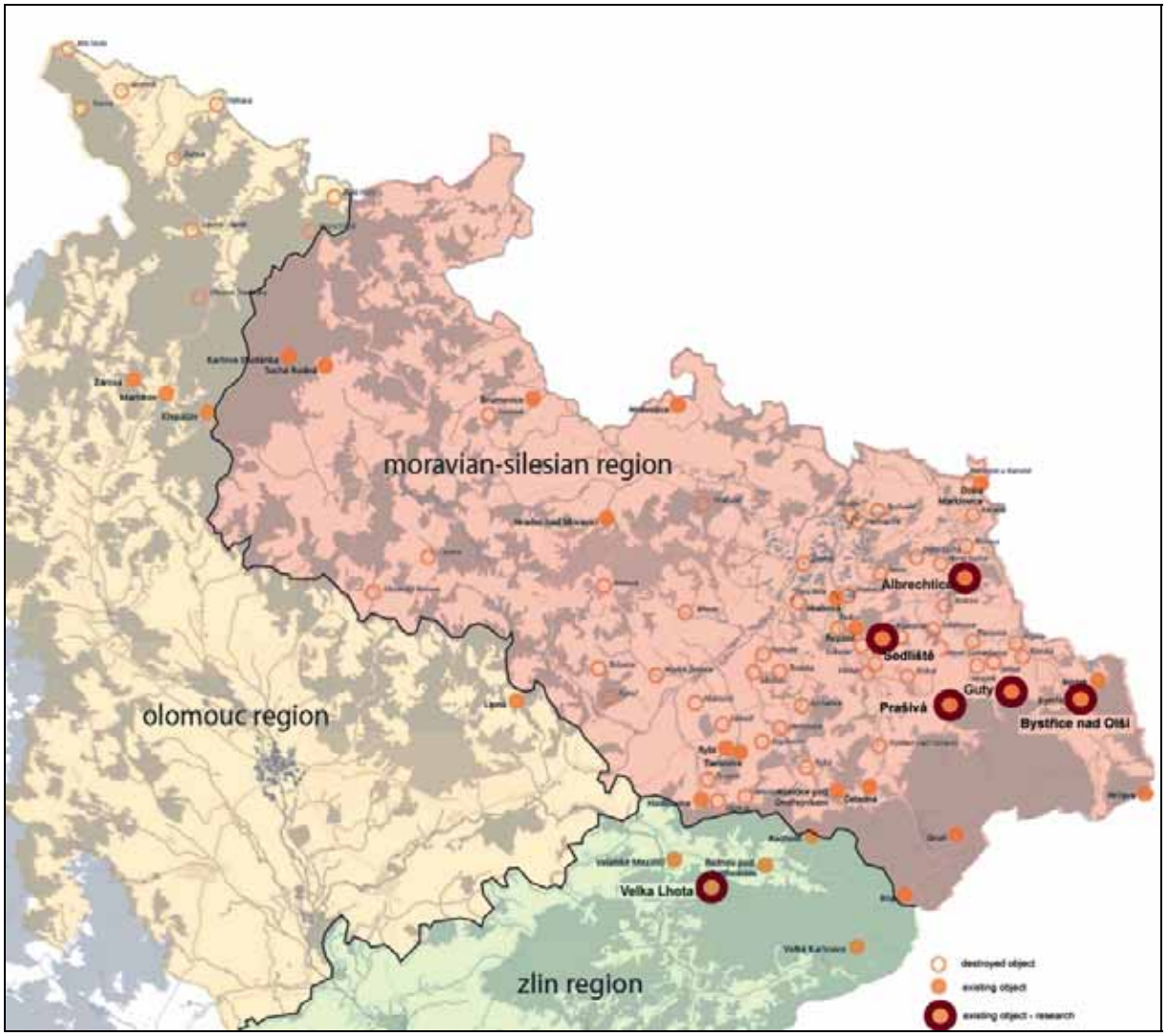
All the culture monuments are on a State List of Immovable Cultural Monuments. At present, this list contains about 40,000 items. These include 196 buildings marked as national cultural monuments, 40 cities with a historic centre classified as an urban monument reserve. Twelve items have been put on list of UNESCO cultural heritage.

In 2002 the Czech Republic adhered to European Archaeological Convention and to the European Architectural Convention. Having made this step, the Czech monument protection is now part of European and worldwide context.

WOODEN RELIGIOUS BUILDINGS IN THE CZECH REPUBLIC – MORAVIA AND SILESIA

Helena Zemánková, Zuzana Jacková, Studio of Monument Reconstruction, Faculty of Architecture, Brno University of Technology
Petr Hradil, Faculty of Civil Engineering, Brno University of Technology

Wooden religious buildings are seen as the peak of the art of rural building. They have mainly been preserved in the Eastern European countries in Poland, Slovakia, Czech Republic, and Ukraine. In the Czech Republic, most of them can be found in the northeast of Moravia and in Silesia. Out of the 366 probably existing Moravian-Silesian churches and chapels, 31 wooden churches have been preserved. Their number, however, is slowly decreasing as evidenced by the situation around Těšín where, according to the archives, out of the 74 wooden churches, only 10 have been preserved: in Albrechtice u Českého Těšína, Bystřice nad Olší, Dolní Marklovice, Guty, in Hrčava, in Nýdek, at Prašivá, at Repiště, and at Sedliště.



1. Map of the existing and destoyed churches in Moravia and Silesia (Z.Jacková, J.Mléčka)

Apart from the above-mentioned churches also churches in the Beskydy mountains, and in the area in Moravia-Silesia around this mountain range at Gruň, in Kunčice pod Ondřejníkom, at Bílá. In the Kravaře area, wooden churches can be found in Tramovice u Štramberku and at Rybí. In Walachia, churches have been preserved at Valašské Meziříčí, at Velká Lhota, at Velké Karlovice and at Radhošť. Apart from this area, small churches have been preserved at Lipná u Polštátu, at Hněvošice in the Opava region and, among the wooden churches and chapels in the Jeseníky mountains, once so numerous, only churches at Žárov and Maršík in the area around Šumperk have remained.

Until the 17th century, an overwhelming majority of churches were built of wood, the commonest building material in the Moravian-Silesian region to date. Wood species available in the immediate vicinity of the construction were mostly used for the structures built, that is, fir, spruce, and oak. If the structure's serviceable lifetime expired or it accidentally burnt down, a new church was built within a short period. There could be up to three older churches on the same place. Only a few structural members remain from them as they were reused in a new structure. There are many differences between the load-bearing structures of each church. Local builders often bring new inventions such as mixed frame and wall supporting system or new type of roof truss.

The oldest wooden churches began to be built in Moravia and Silesia in the 13th century. By their nature they can be seen as being among West-Slavonic type churches that can be found mostly in the Czech lands, Poland, and in the Orava and Spiš areas of Slovakia. In spite of intense German influence in the region, their unique style endures because of very strong and old tradition of wooden construction. The distinguishing sign of the Moravian and Silesian churches is the dependence of their ground plan as well as of their overall church space conception on the style, mostly gothic religious architecture. Wooden churches have mostly one nave with a polygonal chancel entered from the front of the church. The construction of the church started mostly with stone bedding of heavy boulders that provides good ventilation to prevent absorption of ground and underground water. The first row of main building timber walls is made of huge oak logs as an additional

water protection and stiffening frame. The nave is neither very large nor high and it usually doesn't exceed dimensions of ordinary log cabin. Builders rather emphasized precision and decorativeness of their work. The ceilings of wooden churches are mostly flat. Rarely a wooden vault was used. The presbytery of the Guty church is an example of one. The saddle roofs are rather high and shingled. The roof often continues to the ground level to protect foundations and walls against bad climatic conditions. The gallery under overhanging roof proved to be useful shelter for gathering people in rainy days. Therefore it was usually built even if the roof ended with the walls. The church truss structure is based on the originally German close-couple system, completed by struts and tie beams. The structure components of massive beams are joined and often reinforced with wooden pins. The following may serve as examples of 15th century churches: St. Martin church in Karviná (originally a wooden church first mentioned in 1447, since 1795 with brick walls), All Saints' church in Rožnov (brick walls erected from 1748 to 1752), Virgin Mary's and St. Catherine's church in Zubří (dating back to 1453, brick walls since 1788) , St. Mark's church in Heřmanice (first mentioned in 1447, pulled down in 1868), All Saints' church in Konská u Třince (parish church in 1447, brick walls erected in 1795), Virgin Mary's Ascension church (first mentioned in 1447, brick walls erected in 1788).

The early 16th century wooden churches are built with triangularly finished presbytery and towers begin to be erected. The space under its belfry can accommodate more people than the nave itself These are based on a structure in long beams with slightly sloping walls bearing the floor of a prism-shaped belfry with a pyramidal roof. Later the towers acquire polygonal ground plans. The helmets are shingled with two-stage onion-shaped roof on top with a lantern. At first, the towers were built as structures on heir own in the vicinity of churches, being attached to churches later on above their main entrances. These were at first in the form of a low shed roof, becoming a structural part of the church later on. In the 16th and 17th centuries, a gallery is added around the nave with a simple column structure and a shingled shed roof. These type of churches have been preserved in Hodslavice, Ostrava–Hrabová, in Sedliště, Guty, and in Dolní Marklovice.

As the artistic styles were changing during the centuries, so did the decoration of churches. While the renaissance style had barely any effect on their appearance, the baroque influenced both the interior and the outward look. The shape of the triumphal arch between the nave and the presbytery changes, the simple flat form is replaced by an arch. Windows become mostly larger, their shape is changing and many are glassed with pellucid as well as stained glass, mostly in the form of small panes.

Wooden churches are mostly catholic. This was due not only to the fact that so was the population, but also to the counter-reformation period during which all but catholic denominations were banned with their churches being forcibly given to the catholic church. It was only after the Soprony Assembly's Articles in 1681 and the Tolerance Edict issued by Kaiser Joseph II in 1781 that a regulated number churches were allowed for non-catholic denominations. Such churches had to be built without towers, without fortifying components, brick walls couldn't be used and they could not be situated at major roads and in important places. The largest number of these after-Soprony-articles and after-tolerance-edict wooden churches has been preserved in Slovakia. There is only one such church in the Czech Republic - in Velká Lhota near Valašské Meziříčí.

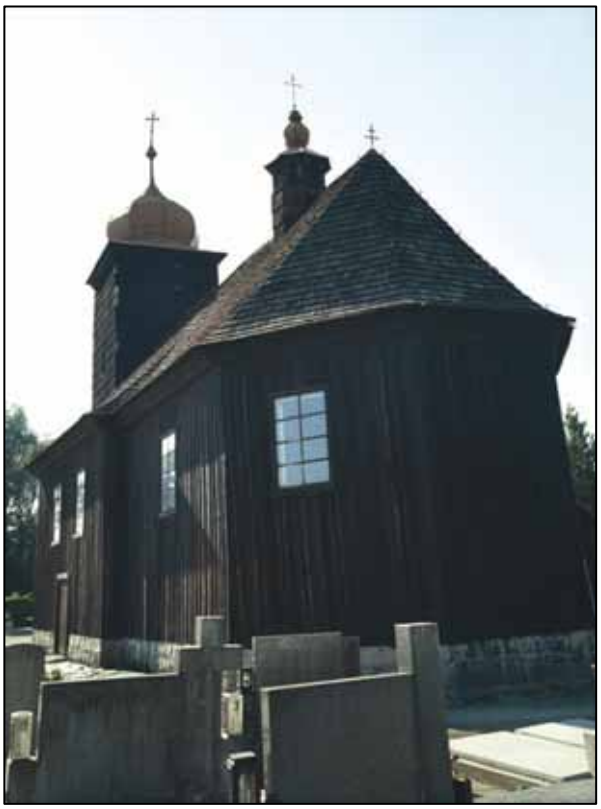
The 18th and 19th century churches had mostly brick walls. A wooden church at that time was seen by the people as opposed to brick-walled one rather as a makeshift building. Therefore not only damaged or burned down churches are bricked, but also buildings in good technical condition. Small wooden bell-towers are replaced by brick-wall ones almost in all the villages, gradually beginning to serve for religious service and being transformed into chapels. Exceptions are the mountain areas of Jeseníky and Beskydy with abundance of wood where the tradition of timbered architecture was still live. However, the overall trend had caused a considerable reduction in the number of wooden churches in our territory. The defunct buildings included churches in Čechovice, Hnojník u Oder, Studénka, Třanovice, Heřmanice, Vrbice, Sádek u Horního Benešova, Tošovice u Oder, Kopřivnice, and Životice u Nového Jičína.

In 20th century, a large number of churches still become defunct. Photographic and graphic documentation of the defunct churches has not been collected being scattered in museums and archives of monument protection institutes or private collections of old photographs and picture postcards. Only a few fragments of the past heritage have been preserved that are worth our care and attention. Some of wooden churches are used for relatively short periods and most of the year they are closed. Suitable conditions for fast wood degradation are developed by interaction of factors as insufficient ventilation and heating in occasionally used structures. One of them is the church in Albrechtice, which is in a rather poor technical condition. By enlisting the church in our project we would like to stress that it is important to increase people's awareness of the wooden churches both in this country and worldwide to uncover the "hidden" heritage and beauty of the times past as well as binging about their reuse and revival so that they can continue to tell their stories.

This is also the main objective of the Culture 2000 project as part of which we listed 10 candidate-wooden-churches in the North East Moravia in cooperation with the National Monument Protection Institute in Ostrava. The database form designed by the project leader has been filled in for 6 of these churches. The following churches have been selected:

1. St. Peter and Paul's church in Albrechtice, Silesia, Moravian-Silesian Region
Ostrava - Opava Episcopate, Deanery of Karviná, Parish of Albrechtice

Cult: Roman Catholic church
Period: late Baroque, 18th Century
Building Category: Rectory church
Protection: Cultural monument
The St. Peter and Paul's church is situated in the cadastral area of Albrechtice u Českého Těšína next to a local cemetery near the river Stonávka. The building lot is on the border of the village on a plane ground with access in its southern part from a local road. To the East is a basic school with a playground. The church is one-nave wooden church with stone foundations. Slightly set-off three sided bema, the nave has almost a square ground plan. The tower is four-sided, slightly conical, 18 m high, set off in front of the western front of the nave where the entry is situated. It is covered by a cupola from galvanised sheet with a metal cross 1.8 m high. The nave is protected by a saddle shingled roof with a spirelet on the ridge. The bema and the nave are panelled. In the interior, the bema and the nave are separated by a triumphal arch with a carved date of 1766 and initials of W.P. The ceiling of the church is formed by wooden casing left in its natural colour. The nave is 17 m long and 8,5 m wide. The pavement is from Gondul sandstone. There are 8 windows in the walls each with 8 panes.



2.

2. The Exaltation of the Cross church in Bystřice nad Olší, district of Frýdek-Místek, Moravian-Silesian Region, Ostrava - Opava Episcopate, Frýdek Deanery, Vendryně Parish

Cult: Roman Catholic church
Period: Romantic period, 17th Century
Building Category: Subsidiary church
Protection: Cultural monument
The church is situated in the place of a wooden 16th century church, in the middle of the developed area of a village on a slope along a road. It is delimited by the fencing of the old church. A cemetery is situated around an isolated church. Old evangelical church 1587, from 1654 it belonged to the Catholics, who disassembled it and built a new (catholic) church 1897 (in a romantic style designed by Albín Prokop). The church is one-nave building with rectangular, 20 x 18 m ground plan a 10 m high tower above the entrance and a polygonal chancel (flat-hexagonal-shaped) on the other side of the nave. The vestry with a staircase plus entry to the pulpit and toilet (used now as a teaching room for small children) have been added to the left-hand part of the nave. The staircase in the tower leads to a loft (with an organ) from where a ladder continues up to the tower. The foundations are made of stone. The upper structure is wooden. The roof is shingled and the ceiling is formed by wooden beams. The truss is traditional wooden, the floor is planked. The window frames are carved, and the door has a carved frame. The walls of the nave are made from smooth beams with motives of vine in some joints. In the back of the nave is a wooden loft supported by two high pillars. The parapet is carved with simple ornaments related to elements of rural art. To the left of the church is a thee-winged renaissance altar, with the middle part depicting Virgin Mary bewailing Christ, the left-hand side representing Virgin Mary and the right-hand side St. John. The middle wing bears a signature and the date P.R.1588. The entrance door of the church is decorated by ironwork and woodcarving. The fixtures include a renaissance picture, two statues of Virgin Mary, Jesus Christ and a 19th century altar.

3.

3. Corpus Christi church in Guty, Moravian- Silesian Region
Ostrava - Opava Episcopate, Střítež Parish

Cult: Roman Catholic church
Period: Renaissance, 16th Century
Building Category: Subsidiary church
Protection: Cultural monument
The church is situated near Guty, village in a valley in the middle of fields. There are full-grown foliaceous trees around the church and a stream runs nearby. The cemetery is part of the church. The church is an one-nave church on a near-square ground plan, with the choir above the entrance to the nave. The choir is decorated with rural paintings, wooden log house altar at the head of the church, the vestry to the left of the altar. The pyramidal tower with an onion-shaped belfry protects the space in front of the main nave from bad weather. The interior of the church is very decorativethe choir has rich painted ornaments dating back to 1634 when it was being extended. The walls covered with rural paintings on canvas (at present the paintings are in good condition). The design of post heads carrying the choir is of similar rural type, have heart-shaped ending of the planks sheathing the belfry head.

4.

4. All Saints' Church in Sedliště, Silesia, Region of Walachia
Ostrava - Opava Episcopate, Frýdek Místek Deanery

Cult: Roman Catholic church
Period: Modern period, 1st half of 17th Century
Building Category: Parish church
Protection: Cultural monument
The church is situated in the middle of a village with a road encircling it. The territory on which it stands is not a protected area. In the vicinity is land with active mines underneath. The village is situated in an area protected because of the occurrence of deposits. The geologic sub-base is formed by sandstone, slate, loess loam, gravel, and sand. The church is 22 m long and 10 m wide. It has one nave with the dimensions 9 m by 5,8 m. The nave includes a choir, presbytery 5,6 by 4 m. to the right (south). A vestry is added on one side of 1,8 m by 3,6 m with a gallery above it . A separate square tower above the entry was added with a cupola belfry facing east, a covered gallery called "sobota" is around the church to protect the church foundation from bad weather. An old cemetery lies around the church. The entire complex is contained within a wooden fence with a wooden crest and two gates situated opposite each other. In front of this area near the western gate stand statues of Virgin Mary of Frýdek and Jan of Nepomuk hewn from stone standing on prismatic posts.On the left of the entry is a large wooden cross. On the other side of the entry is then a small cross with a thorn crown installed here in 1994 bearing an inscription reading "The village to the victims of communism".

5.

5. Wooden Tolerance church in Velká Lhota, Central Moravia, Walachia
Evangelical Church of the Czech Brethren, East Moravian Seniorate

Cult: Evangelical Church
Period: late Baroque, 18th Century
Building Category: Protestant church
Protection: Cultural monument
The church is situated at the access road to the village on the south western slope in the hilly landscape. The entry to the church is from the south east and it is longitudinally oriented along the south-west-south-east axis. The nave of the church is 16,1 m by 10,4 m and the entry is situated in the middle of the longer side. The pulpit is opposite the entry, to the right entry to the vestry size 3,62 by 3,15. The altar is placed in the centre of the area. The gallery is situated along the entry side and both shorter sides, steps to the gallery on both sides of the entry. Light comes in through 6 small windows in the upper part of the walls, two windows in each longer side, on each shorter one, six panes to a window. On the entry side and to the right from the entry, the church is extended by a covered gangway open to the roof about 2 m wide.

Pews facing the communion table are situated in the centre part of the church.They are not identical and they were made by the church-goers themselves. There were at least two pews for each family, one upstairs for the men and another downstairs for the women and children. The pulpit is covered with a colourful decor in Hungarian national colours. The original colours have been preserved. The pulpit was probably designed by parson Josef Gerža Jr. The columns and railing of the gallery are wooden, carved, white coloured.The wall paintings in the middle of the ceiling are black on white, with an inscription surrounded by an ornament: Mine house, house of prayers, gelf.Mat XXI13., 1783The wall paintings at the entry to the pulpit and above the door leading to a store room are black oval with gilded inscriptions:
- to the left of the pulpit: I want you to know, brothers, that the gospel I preached is not something that man made up. I did not receive it from any man, nor was I taught it; rather, I received it by revelation from Jesus Christ. Galatians 1,11 – 12
- to the right of the pulpit:. Who among you fears the LORD and obeys the word of his servant?. Isaiah 50,10, O my people, hear my teaching; listen to the words of my mouth. Psalm 78,1
In the 1990's the outdated harmonium was replaced by an organ made by Jiří Vaculín from Vsetín placed above the entry to the gallery.[1]

6.

Conservation and protection methods applied to historical timber structures of religious buildings
Bohumil Straka, Jan Vaněrek, Petr Hradil, Faculty of Civil Engineering, Brno University of Technology
Ivana Žabičková, Faculty of Architecture, Brno University of Technology

1. PLACE

The wooden churches under investigation are situated in Silesia (formerly an independent region now belonging to the Czech Republic as its north-easternmost part) in a piedmont woody landscape.

2. AGE

The age of the churches, all of them under monument protection, is measured in centuries. The latest church erected in 1897 was built in the place of a 16th century wooden church destroyed by a flood. Other churches have

Bibliography: Polášek, J.; Wooden Churches and Chapels of Moravia and Silesia [*in Czech*]; AGAVE; Český Těšín; 2001
Londzin, J.: Koscioly drewniane na Slasku Cieszynskim, nakladem i drukiem „dziedzictwa blog. Jana Sarkandra", Cieszyn, 1932
Information: The National Monument Protection Institute in Ostrava, information received during the Culture 2000 project
Note: The descriptions and pictures of the churches are taken from the inventory forms under investigation.

existed for 220 to 700 years and have been repaired, extended, and reconstructed several times. The exact age of each church could be determined, for example, by a dendrochronological analysis provided, of course, that no beams from an earlier church have been used for the construction.

3. INFLUENCES

The condition of each church has been the direct result of the influences on it over the years of its existence. Negative influences always bring about defects that have to be repaired. Therefore, correct evaluation of such influences is very important for any successful reconstruction or repair.

3.1 Internal influences

3.1.1 Material

Stone and wood were the prevailing traditional building materials in the foothills. They were also used to build churches – stone for the foundation, socles, floor tiles, and flagstones in the vicinity of the church, wood for the entire upper part of the construction, the roofing and the interior. The local craftsmen had been used to working with such materials for centuries and therefore were good at selecting quality material. Very often, fir wood was used for construction, but nowadays one can also find a number of other wood types in churches used for additions, reconstruction, and repairs.

3.1.2 Design of load-bearing structure

No theory of load-bearing structure design existed at the time the churches in question were built; it was mostly customs and tradition that were the decisive element later incorporated in fire and building rules – the predecessors of building standards. The design of a small church was made by a reputable local builder, who, because lacking exact knowledge of a number of things, was rather guided by his instinct. For this reason, one can find a number of deficiencies in old buildings from today's point of view. They include insufficient depth of foundation, in the first place, sometimes the foundation was non-existent. Also the section sizes of the wooden profiles of bearing structures were inadequate as was sometimes even the structural arrangement. Sometimes also the choice of the building site was wrong as in cases of places regularly, if not very often, flooded even.

3.1.3 Quality of work

Construction work on churches was of good quality corresponding to the then state of the art using expertise passed from generation to generation. Reliable and able craftsmen were chosen for the construction.

3.2 External influences

3.2.1 Environmental influences

These include influences of the climate, the aggressiveness of the environment and the manner of utilization of a building. The climate – mostly the temperature and water – represents a wide range of influences that result in a number of defects mostly caused by water leaking into the building and its wooden structures. Humidity and temperature gradient bring about degradation of wood by wood decaying fungi. These fungal attacks lead to the decreasing of wood volumetric weight what is the most important character for wood degradation. The timber strength is decreasing according to the rate of fungi degradation. UV light effect when elements are exposed to sunshine can lead onto the surface degradation of wood elements (e.g. shingles) if the elements have not applied surface protection. Heavy snowfall, so often in higher altitudes, may also cause a great deal of problems, with snow remaining longer on wooden roofs thus having a negative effect on the shingles.
The aggressiveness of the environment, which is a modern problem, plays no significant role in historic wooden churches, as they are mostly situated in rural areas. This can also be said of the way in which a building is used because it is extraordinarily sparing in religious buildings. The only critical point tends to be the choir loft with an organ for which the roofing may be insufficient and next towers with bells where defects may appear sooner because of the bell vibrations.

3.2.2 Change in the foundation

Changes in the foundation usually bring about construction instability which is dangerous mainly in wide-span and high buildings, to which churches belong (the nave and the tower).
This also includes changes in the underground water level with the related changes in the soil humidity, which, in fine-grain soils, may cause decrease in their bearing capacity, next freezing of the footing bottom, vibrations distributed in the soil and undermining. Of the preceding influences, some were removed in the past such as additional underpinning (with concrete) of the foundation, landscaping to bring water outside the building, the provision of spouts and eaves to bring rainwater outside the building and the surrounding soil as soon as possible.

The changes in the underground water level cause problems in one of the churches under investigation, which was built near a stream that inundates at certain intervals. Due to insufficient foundation, the church tower began to lean, which is mainly visible from the inside.
The churches are situated in a quiet, not undermined area and are, therefore, exposed neither to vibrations caused by heavy traffic nor to the effects of undermining.

3.2.3 Inappropriate or insufficient human intervention

This includes insufficient maintenance, improper use of the building, inadequate construction changes in the bearing structure, and changes in the immediate vicinity of the building. The most significant of these influences is insufficient maintenance, which is for two reasons in churches. It is the negligence of minor repairs either because the defects have not been recognized in time or because the repair in question is not seen as urgent. Each neglected defect tends to grow as time goes by, and it is usually at this stage that the second reason comes in, that is, lack of funding. By the time the necessary funding is raised, the repair needed significantly grows in size.
There is usually no such thing as improper use in churches, but a number of inadequate to barbarous repairs and reconstructions do occur. A repair or reconstruction of the neatly worked out original construction with a number of decorative elements even in inaccessible parts (lofts) usually adds profiles that, although providing additional security for the construction, degrade it aesthetically. Such poor quality of repairs was really found in some churches even in public parts. The reason here was not a poorly designed repair or reconstruction but its implementation. In this respect, we at present found ourselves in a situation rather reversed to the one at the time of the construction. Then, there were skilled craftsmen and no theoretical knowledge, while now, even if the theory and state-of-the-art computing methods are available, the building company hired usually destroys the effort expended.
Changes in the immediate vicinity such as road constructions and pipe tunnels have not touched the churches in question, but often cause extensive defects.

3.2.4 Time influence

If treated and maintained properly, wood is a material with a long service life, which is evidenced by wooden churches. The aging of wood first causes the joints to come loose with the behaviour of the loosened truss plates being different from that of the original rigid ones, which brings about construction deformation. Subsequently, this leads to degradation of the wooden material. The fatigue shows locally mostly through the effect of bell vibrations.

4. DEFECTS

The defects found in the churches under investigation can be divided into two basic groups:

- deformation
- construction instability
- wood degradation (decrease in strength, loss of material, cracks)
- others such as inadequately performed repairs, ...

4.1 Deformation

Excessive deflection of ceilings above the nave suspended on the roof truss is frequent. This is caused by the truss joints coming loose and the wooden material of the ceiling being degraded. Some deformations are caused by the lower horizontal beam rotting away due to ground humidity, with the subsequent buckling of the above-ground elements.
In a number of cases, this is caused by an insufficient size of the bearing structure or individual structural elements.

4.2 Structural instability

The usual cause of instable structure almost in all of the churches under investigation is insufficiently deep or missing foundation. This shortcoming had already shown earlier and had been put right. To what extent this was done properly could be determined by observing the structure over a long period and by making probes in the foundation.
In some churches, individual walls are buckling, in one church the entire tower, in some churches no defects have been observed.
The trusses of the saddle roofs may serve as an example of how important the correct functioning of joints is. As the joints come to be loose, the pieces are released from the coupling loosing their strength. With the exception of the latest churches, the trusses had been repaired and the structural elements replaced several times as can be observed when inspecting the truss.

4.3 Wood degradation

During the inspection of wooden elements in the churches in Silesian region was not detected significant wood degradation leading to the construction collapsing. Between the most frequent causes of wood damage we can mention these biological ones:

- Infestation by wood attack insects,
- Attack by wood decay fungi when suitable moisture condition,
- Wood corrosion.

Wood damage by insects

Mostly these types of degradation effect considerable degradation of wooden elements by larval phase. A number of beetles and weevils preferentially attack rotted wood (see picture below).

The variations between insects are in the lengths of each stage in their life cycle, also in the type of wood attacked and the type and extent of wood degradation caused. Correct identification of type of insect is essential for right and useful treatment.

There exist huge differences during the larval stage between favourable temperatures and moistures conditions at single types of insects.

Despite the moisture condition of wood with minimum moisture content about 20,0 % for rising of wood fungi the moisture limit for insects evolution stays lower. Just for this particular is not possibility for wood protection only by the constructive treatments. In the historical monuments of Silesian region to the main wood-inhabiting beetles belong longhorn beetles (*Cerambycidae)* and deathwatches (*Anobiidae).*

7. Surface damage by wood attack insects, 50 mm depth, Church Prašivá

8. Typical oval emergence hole from the longhorn beetle (*Hylotrupes bajulus*), Church Prašivá

9. Wood damage on surface by insects, existing the bore dust, Church Prašivá

10. Wood damage on surface by insects, existing the bore dust, tunnels, Church Prašivá

11. Damage of decking of ceiling by insects, Church Prašivá

12. Presence of using the un-barked elements in the roof construction, Church Prašivá

Wood damage by wood decaying fungi

The main criteria of decaying fungi are loss of wood material and simultaneously decrease in its strength. When there is suitable moisture condition (above 20 % of wood moisture contents) wood attack can rise and grown. They break down the wood cells by production of series of intra- and extracellular enzymes from mycelium. They realize their own metabolic activity into the wood materials by this way. Wood decaying fungi (almost *Basidiomycetes*) can cause till the 95 % loss of material. The surface of such damaged wood is almost soft and attacked wood can accept much more quantity of water. Their destructive effects can be readily distinguished with the naked eye, but for the treatment assessment must be the type of fungi identified. Wood decaying fungi are divided into the wood-rotting fungi (white or brown rot fungi) and soft-rotting fungi.

13. Water leaking over the wooden wall frame, Church Albrechtice

14. Water leaking into the ceiling construction, presence of wood insects´ circular emergence holes from *Anobiidae,* Church Sedliště

15. Wood degradation by brown rot fungi, Church Albrechtice

16. Detail of wood degradation by brown rot fungi, Church Albrechtice

Wood damage by corrosion
Timber at some historical buildings should be damaged by degradation of the fibrous wood structure, which gives rising the macroscopic appearance of a "hairy" on wood surface. This wood corrosion is as rule combined with biological attack and brings about degradation of mechanical properties. Responsible for this wood corrosion are the recent type of coatings protection by substances based on ammonium phosphate and sulfate.

4.4 Others

Other defects do not occur so often, only occasionally. An interesting problem is the defect of a structure caused by a man who destroys values while being convinced of the positive effect of his activity. Such interventions are rare in bearing structures, but frequent in the interior such as replacing historic pews with new ones only worth the material used and the work put in.

5. GENERAL CONCLUSIONS

Despite all the defects and shortcomings detected, the service life of wooden churches is surprisingly long considering the negative effects they have been subjected to over centuries. These are mostly cultural monuments that carry the regional cultural values. From this point of view, all the churches under investigation should receive much more attention from experts to extend their service life.
This attention should consist of the following measures:

- detailed research
- determination of defects and their causes
- removal of causes (if possible) and thus the defects
- further expert maintenance on a continual basis

Unfortunately, the above measures cannot be guaranteed by the owners. Therefore it would be good to at least approach this ideal situation in the subsequent projects.

5.1 Restoration model of historical structures

The restoration model should contain the general conclusions of the survey, analysis and evaluation of historical monuments.
Important items for the analysis, determination and evaluation of restoration methods include especially:

Results of the structural survey:

- spatial configuration of the load-carrying system
- type and dimensions of load-carrying members (real effective cross-sections)
- type of joints and connections (connections of historical timber structures are made especially by means of carpentry joints secured by wooden dowels)
- location and extent of wood damage by biological or non-biological factors
- location and extent of connection damage
- determination of load-actions (values of permanent and variable actions)

Determination of calculation models:

- for the original conditions of the structure
- for the real conditions of the structure

Material properties of the wood:

- original and real timber quality
- material characteristics of wood from particular technical survey (laboratory examination of the wood sample; or in situ materials evaluation by preferring non-destructive additional methods if possible to mechanical ones)
- identification of wood attack types due to biological and non-biological factors (including the wood corrosion due to poor protection technology) by laboratory testing methods
- risk of decay or damage in future

5.2 Analysis and evaluation of historical structures

The analysis and evaluation of the restoration methods includes:

- to evaluate the necessity of temporary stabilization
- to decide on local, partial or global restoration
- to choose an appropriate method of the rehabilitation
- to substitute damaged members and joints

The most important requirement contains the conservation of historical monuments:

- their original configuration

- differentiation of their building stages
- conservation of original members, parts and joints
- compulsory maintenance

The substitution of damaged members can be carried out using:

- original wood from another part of the structure (if possible)
- new wood of the same kind and shape (stiffening by additional members has a negative influence because it changes the original state of the structure); in this cases prefer heartwood to sapwood, which is much more susceptible to biodeterioration, connection between new and original timber part should be strengthened by fibreglasses reinforcement and injected by polymer resin
- an injection method based on a special kind of adhesive (only special kind of adhesive should be used for the injection method; appropriate are adhesives based on epoxy or polyurethane resins)
- an appropriate method of wood protection (mostly preventative chemical liquid preservatives according to the wood conditioning and appropriate secondary preservation by non-transparent coatings)

The structural issues of historical churches are quite similar to the problems in other historical monuments, especially castles and historical houses:

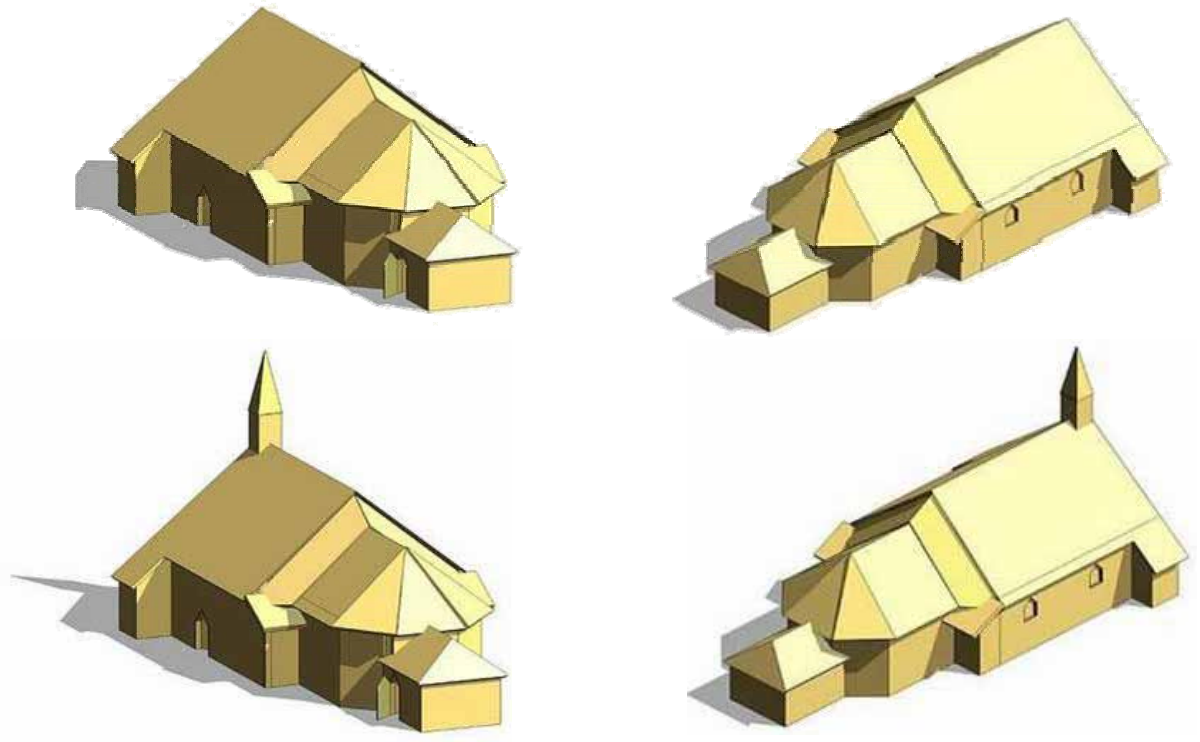
- calculation models should respect the spatial arrangement of the load-carrying structure
- all established facts and factors should be contained
- at present, the method of limit states is applied for the calculation and verification of historical structures (the structure should satisfied the conditions of ultimate and serviceability limit states)
- as a rule, the load-carrying capacity of joints and connectors is a decisive factor (especially the capacity of carpentry joints due to high intensity of normal stresses acting perpendicular or at an angle to wooden grains in contact areas and shear stresses acting parallel to grain in shear areas)
- spatial stability of the structure must be secured in all states of the structure.

6. SUBSIDIARY CHURCH OF ST. ANTHONY OF PADUA AT PRAŠIVÁ, MORAVIAN-SILESIAN REGION, OSTRAVA - OPAVA EPISCOPATE, FRÝDEK MÍSTEK DEANERY

Cult: Roman Catholic Church
Period: Modern period, 17th Century
Building Category: Subsidiary church
Protection: Cultural monument

6.1 History

This wooden church is situated in Moravian-Silesian region, Czech Republic. The first mass was served in 1640. The ceiling and roof members were cut according dendrochronological report in 1641 – 1642, first written description of finished church without tower was completed in 1642.
The sacristy and choir were built in 1779, the pulpit was built in 1794, the polygonal tower in 1860 and the new rectangular tower was built in 1907.



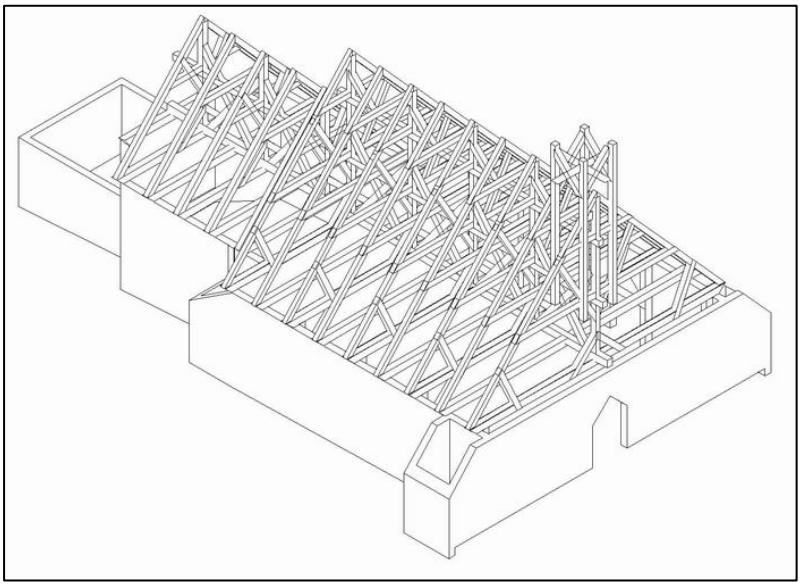
17. The present church is shown in the figure.
It has a single-nave gothic structure with polygonal presbytery and rectangular sacristy and a late gothic roof structure.

6.2 Architectural Typology

The church is situated top of Malá Prašivá mountain near hiker hostel and hiking path in Beskydy Nature reserve. The church is one-nave building with a rectangular ground plan.The bema is three-sided, later a vestry was added to the bema. The church has the pentagonal windows with shutters and double-pitched roof, no horizontal division.A simple turret is above the entrance with corner pyramids, set in the three-to-four tier shingled roof and the ceilings are flat. In the church nave two wooden doors have been preserved with classicism-style ironwork whose box locks and bolt covers are decorated by a motive of prolonged lozenge so liked by the classicism builders. Thanks to the shutters protecting the windows, the window panes have been preserved from the end of the 19th or beginning of the 20th century fixed on suspensions with ball ends. The panes in the upper parts of the windows are decorated by rustic led glazing.

6.3 Nowadays

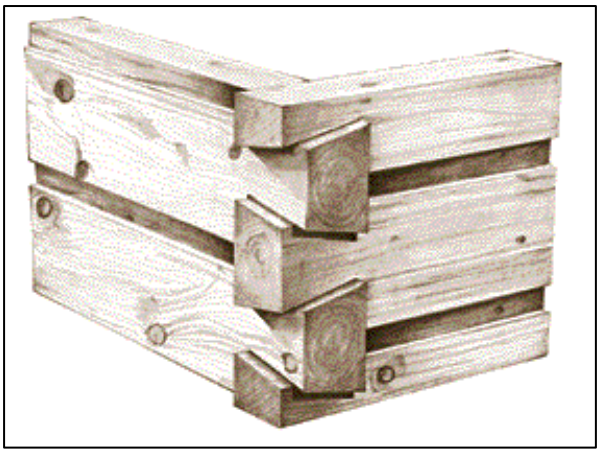
The present church is shown in the figure above. It has a single-nave gothic structure with polygonal presbytery and rectangular sacristy and a late gothic roof structure.



18. The model of the primary load-carrying roof structure with the part of the tower is indicated below.

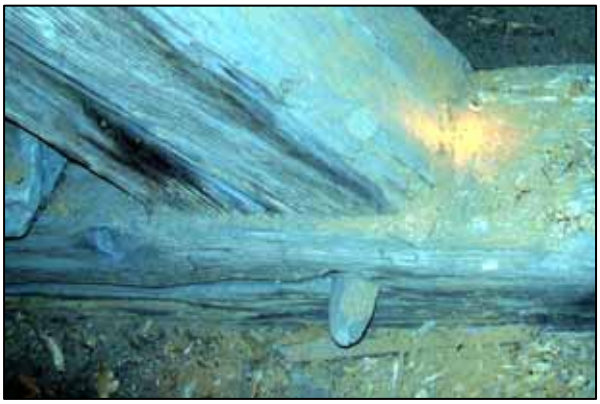
19. Socle of free-laid stones, recently sealed with cement grout.

20. Timber walls of hewn timber or round logs covered with shingles.



21, 22. Typical dovetail corner joints were used for the connection of wall joists.

23. Joist ceiling is supported by walls and columns with struts. Beams are also members of roof structure. Several beams are doubled.



24. Rafters are connected to joist and one or two collar beams. They are supported by columns in principal trusses. Members are overlapped with notched connections with wooden dowels. The detail of mortise and tenon column connection is shown in the figure.

25. A typical detail of overlapped bracing members

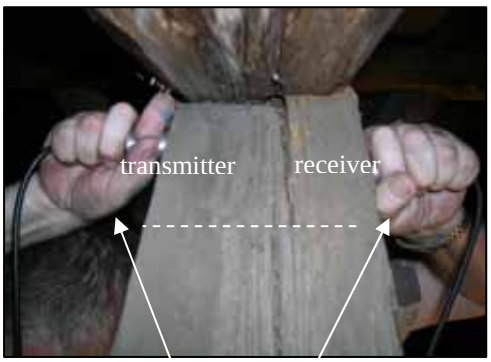
26. A detail of scarf joint of wall beams.

6.4 Non-destructive evaluation of wooden elements

The main goal was to find out the possibility of using the ultrasound as the quantitative methods for evaluation of wood degradation. Wood degradation attends to the loss of material, before all by the wood decay fungi attack. To find out the correlation between the material losses and the velocity of ultrasound waves is the main criteria during the interpretation of results. For the measuring are set the influence agents which can caused the results changing, as existing knots, cracks, moisture contents, temperature and the anisotropy of wood.

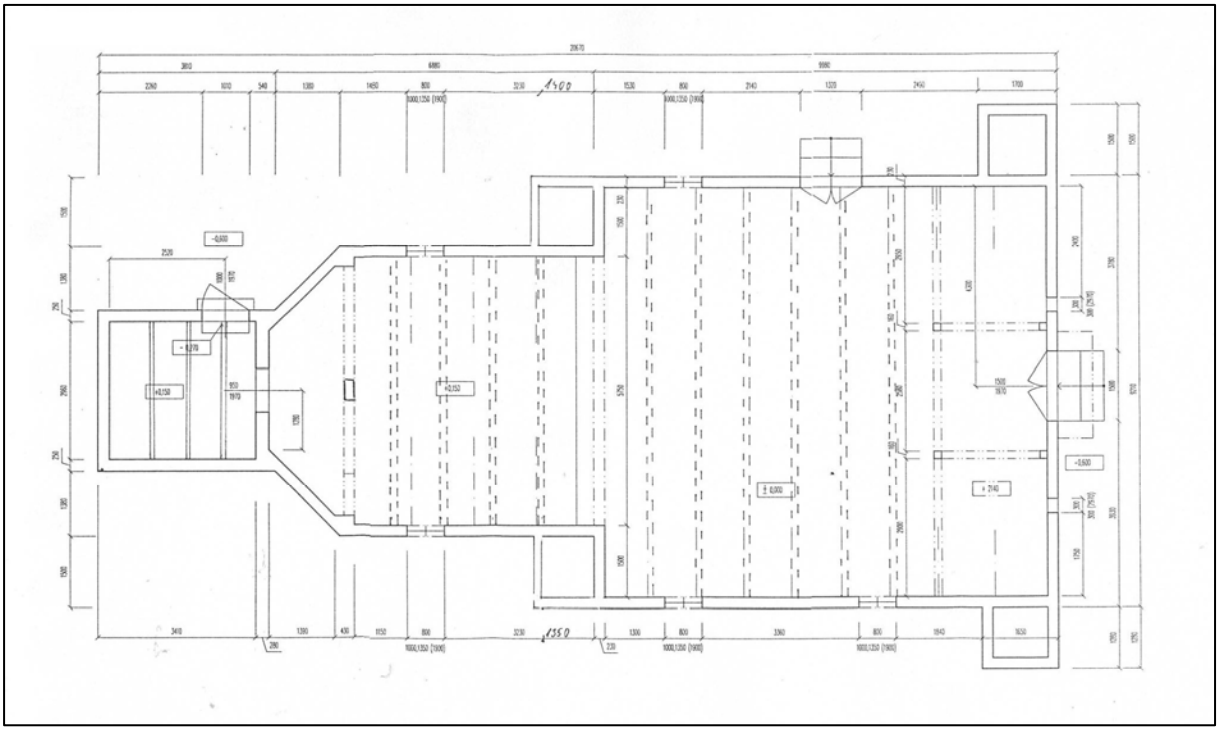
The principle of this method is based on the comparison of the ultrasound velocity which is much faster in solid wood than in wood with inner defects. Experiment was measured by the TICO ultrasonic instrument from the Proceq SA Testing Instruments with using the testing probes at frequency 82 kHz.

The schema of each measuring is shown in the photographs below. By the comparison of received values of velocity on the each elements should be detected inner damage of wooden materials, certainly measuring should be done and interpreted by qualified person.

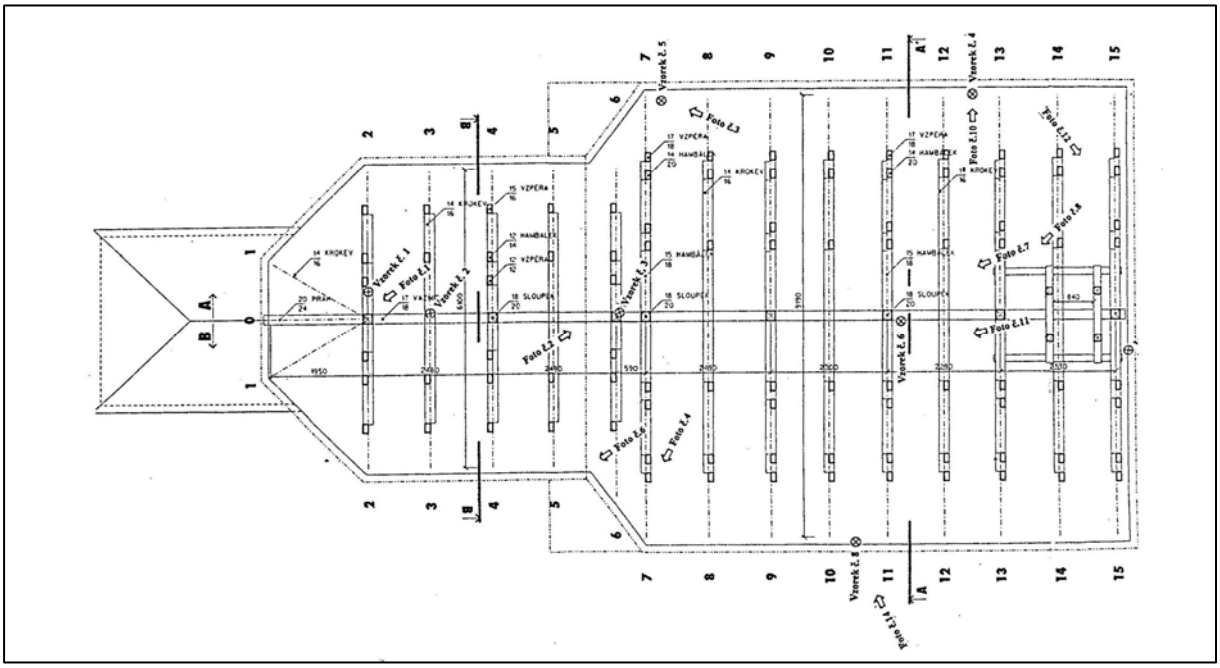


27, 28, 29.

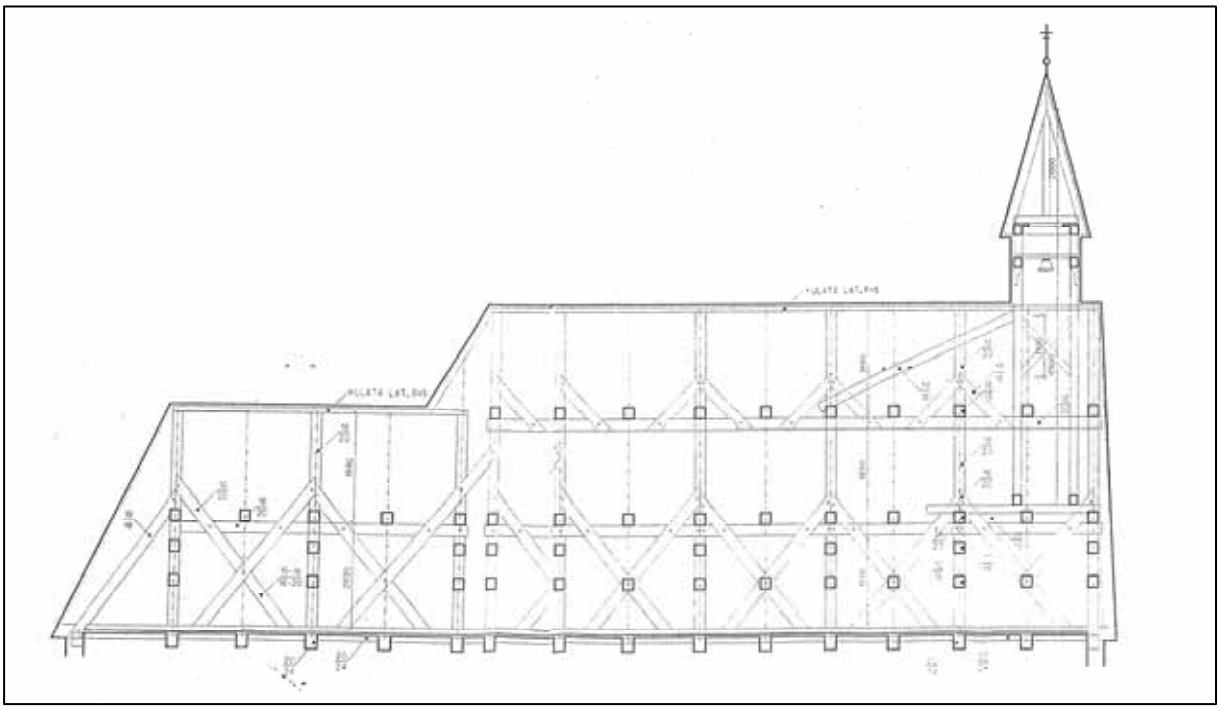
The Church of Prašivá: Drawings



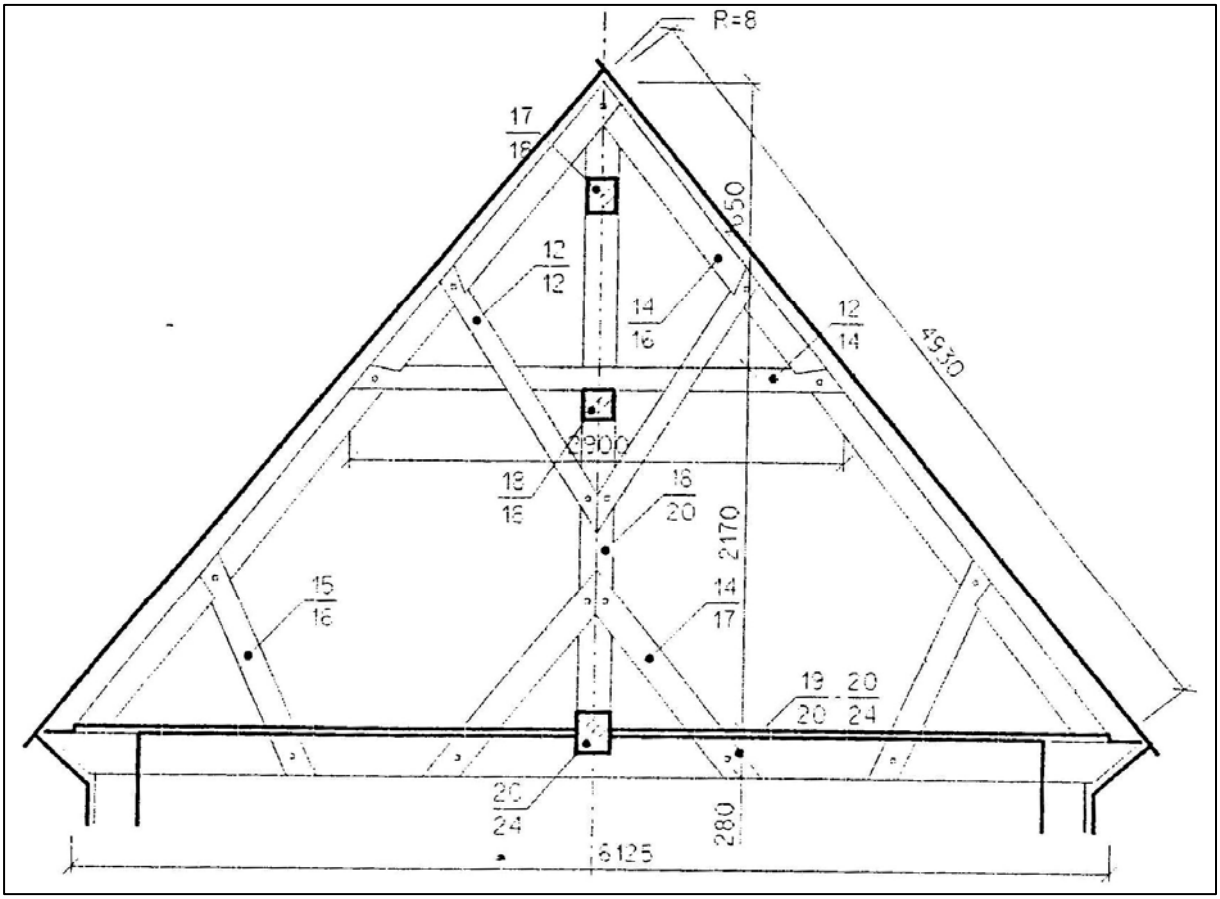
1. Ground-floor



2. Plan of the attic



3,4. Roof sections of the Prašivá church



Reference: Rosová,R.; Augustinková, L.,Constructional and historical research of the State Monument Protection Institute in Ostrava, 2002

CZECH REPUBLIC

Faculty of Architecture, Brno University of Technology

CURRICULUM VITAE

Helena Zemánková

Education
1966 Brno University of Technology, Faculty of Architecture, graduated in 1966 receiving a degree of ing. arch. [Master of Science]
1977 PhD.
1988 Assoc. Prof.
1997 Professorship received at the Faculty of Brno University of Technology
Work experience
1966 Agency for Industrial Buildings
1968 Teacher at the Faculty of Architecture of Brno University of Technology
1977 Scientific degree received of Candidate of Technical Sciences – specializing in industrial architecture, industrial zones
1994 – 2000 Pro-Vice-Chancellor for international relations at Brno University of Technology
1996 A certificate of merit for research and study of industrial architecture awarded by the Italian Ministry of Culture and Environment.
2002 The French minister of education, by his decree issued on 2nd March 2002, conferred upon Mrs Helena Zemánková an order of Chevalier dans l´Ordre des Palmes Académiques for the service rendered to the French culture.
Professional specialization
Protection and reconstruction of monuments
Conversion and restoration of old industrial buildings
Recent publications
ZEMÁNKOVÁ, H.:Create in created, New functional exploitation of abandoned buildings; VUT v Brně; Brno, 2003
ZEMÁNKOVÁ, H. a kol.:Zlin 1900 – 1950; ; Model of Industrial City; Catalogue to the "Ville de Zlin" exhibition held at Ecomusée du Creusot-Montceau as part of the "Bohemia Magica, Czech Days in France" event (May – December 2002), Zlin; 2002
ZEMÁNKOVÁ, H.: Transformation of Functions Proceedings of Papers and Conclusions from the Conference organized by Slovak Architects Society; Proceedings of a conference held in Bratislava on 21st October 2004. The proceedings have been published as a supplement to the journal "Project, review of Slovak architecture", year XLVI; SAS; Bratislava 2004
ZEMÁNKOVÁ, H.: Contemporary Phenomenon / Change of Functions; Proceedings of an International Colloquium on "Change of Functions" held in Bratislava on 30th – 31st May 2005; SAS; Bratislava, 2005
Professional activities
Member of Section for the protection of industrial monuments, Czech Republic
Member of College of Industrial Monuments, ČKAIT et ČSSI, Czech Republic
Member of an international committee of the HERITY association, Rome from 2000
Member of Koinetwork – a European Group of Economic Interest, Paris, from June 2005

Josef Hrabec

Education
1976 Faculty of Architecture, Brno University of Technology
1993 PhD.
Work experience
1988 – present: Faculty of Architecture, Brno University of Technology
Professional specialization
Protecting of Monuments
Relevant research
author of 2 and co-author of 4 grant projects,
author of the partial subject "Prolection of Monuments" under the research project entit led "Czech architecture in the new situation", ČEZ:22/98: 2641000016.
Professional activities
Vicepresident of civil Association POLYPEJE (reconstruction and protecting of Castle Cimburk).

Zuzana Jacková

Education
1995 – 1998 bachelor degree of University of Technology in Zvolen, specialization: "Interieur design"
May 2004 graduated and receiving a degree ingeneer-architect degree, Slovak University of Technology, Faculty of Architecture in Bratislava, Slovakia
specialization :"Reconstruction and Preservation of Monuments"
2004 – now PhD. student of the Faculty of Architecture, Brno University of Technology, Czech Republic
March – June 2006 SOCRATES - ERASMUS, stage on L'Université de Bretagne Occidentale, Institute de geoarchitecture, Brest, France
Work experience
March 2005 – now free cooperator of the Hausverwaltung Nohr, Koblenz, Germany, and of architect-studio The Studio Z, Brno, Czech Republic
Professional specialization
Architecture and Monument Preservation
Relevant workshops
6th –15th May 2005 participant of Intensive Programme Total Quality Cultural Heritage Management, Tomar-Macao, Potrugal
9th- 15th April 2006 Challenge Interuniversitaire des Institutes d'Urbanisme, Lille, France

Bohumil Straka

Education
1962 Faculty of Civil Engineering, Brno University of Technology
1992 PhD.
1997 Assoc. Prof.
Work experience
1962 – present: Faculty of Civil Engineering, Brno University of Technology
Professional specialization
Metal and timber structures and bridges

Recent publications in the field of timber structures
STRAKA, B.: Conclusions from Analysis and Construction of Timber Roof Structures, In: Proceedings of the 5th World Conference on Timber Engineering, edited by J. Natterer and J.-L. Sandoz, Lausanne-Montreux, Switzerland, 1998, vol. 1, pp. 48-54, ISBN 2-88074-380-X.
STRAKA, B.: Conclusions from Theoretical Analysis, Construction and Behaviour of Timber Spatial Structures, In: Proceedings of the 6th World Conference on Timber Engineering, Whistler, BC, Canada, 2000, 6 pp.
STRAKA, B. and NOVOTNÝ, M.: Conclusions from Rehabilitation of Existing Timber Roof Structures, In Report of the IABSE Conference Innovative Wooden Structures and Bridges held in Lahti, ETH Honggerberg Zurich Switzerland, 2001, Vol. 85, p. 475-478,
ISBN 3-85748-1003-X.
STRAKA, B.: Designing and Realization of Timber Roof Structures in the Czech Republic, In Proceedings of the Scientific Session VSU'2001 held in Sofia, Bulgaria, Vol. 1, p. 55-59.
STRAKA, B., VANEREK, J., HRADIL, P., VEJPUSTEK, Z.: Project of inspection of timber churches in Beskydy mountains, In Proceedings of WTA, Praha, 2006.
Relevant research and realization of timber structures
Timber structure of the planetarium in Brno (CR), tennis halls in Frýdlant nad Ostravicí and Bílovec (CR), footbridge in Brno (CR), winter stadium in Vrchlabí (CR).
Professional activities
Member of the Committee for Standardization of Timber Structures
Certified forensic expert for metal and timber structures and bridges
Member of the Council for Building of Timber Houses

Jan Vaněrek
Education
2004 - Ph.D. – Brno University of Technology, Institute of Forensic Engineering
2000 - Dipl. Ing. – Brno University of Technology, Faculty of Civil Engineering, Institute of Building Structures
Work experience
2002 – present: Faculty of Civil Engineering, Brno University of Technology
Professional specialization
Rehabilitation of timber structures; Examination of wooden materials and wooden composites
Recent main publications in the field of timber structures and materials
VANĚREK, J. Building preservation of timbers. In Rehabilitation of damp masonry II. Praha, WTA CZ. 2006. p. 131 - 172. ISBN 80-02-01802-8.
VANĚREK, J., SCHÁNĚL, L. Wood deteoriation by wood staining fungi. In Proceeding Rehabilitation and reconstruction of buildings 2005. Brno, WTA CZ. 2005. p. 39 - 43. ISBN 80-02-01768-4.
VANĚREK, J., SCHÁNĚL, L. Some aspects of wood degradation and decaying gained in building practices. In Proceeding Rehabilitation and reconstruction of buildings 2004. Praha, Czech building society. 2004. p. 22 - 25. ISBN 80-02-01683-1.
STRAKA, B.; VANĚREK, J.; VEJPUSTEK, Z.; HRADIL, P. Rehabilitation of timber constructions of present and historical monuments – analyzing conclusions. In journal Materials for building. 2004. X(7). p. 40 - 44. ISSN 1213-0311.
Relevant research and realization of timber structures
2005 till 2007 - holder of post-doc grant project at The Grant Agency of the Czech Republic (GA CR) 103/05/P270 "Proposal of new fiber composite material with utilization of wood fiber and polymer matrix"
2005 – present: member of research team of the project VVZ MSM 0021630511 „Progressive building material with utilization of secondary raw materials and their influence upon the service life of constructions"
Quality examination of coatings on wooden windows frame by infra-red spectroscopy, Litomyšl; Quality examination of wooden shingles at hotel roof construction, Ramzová; Examination of wooden roof elements against the biological attack on the castle Budišov, region Třebíč; Quality examination of chemical preservation at wooden roof construction; Examination of wooden floorings in different objects; Examination of tie beams and roof wooden elements on municipal house in Přerov
Professional activities
2003 head of the section "Timber preservation and rehabilitation" in the Czech building company ČSVTS, The Scientific and Technical Society for Buildings Rehabilitation and Preservation of Monuments WTA CZ

Petr Hradil
Education
2002 Faculty of Civil Engineering, Brno University of Technology
Work experience
2005 – present: Faculty of Civil Engineering, Brno University of Technology
Professional specialization
Mechanical connections of timber structures
Recent publications
HRADIL P., STRAKA B. Semi-rigid behaviour of timber connections in bending, In proc. of Theoretical and structural problems of steel and timber structures, Kočovce, STU v Bratislave, Bratislava, Slovakia, 2006, ISBN 80-227-2359-2
HRADIL, P. Contemporary structures in Helsinki and Espoo, In Konstrukce, No.3/2005 Ostrava, Czech Republic, 2005, ISSN 1213-87622005
Relevant design competitions of timber structures
Alahärmä light traffic bridge, Alahärmä, Finland

SLOVAK REPUBLIC

Faculty of Architecture
Slovak University of Technology

Rescuing the Hidden Slovakian Wooden Church Heritage from the Viewpoint of the Authentic Materials and Technologies

Eva Kráľová, Ivana Lisická
Faculty of Architecture, Slovak University of Technology

This contribution concerns the factors that conditioned and influenced the use of wood for the constructions of the sacral buildings – the churches – in the Carpathian region of the Slovak territory. It presents the characteristic ways of the traditional construction and the technologies of the wooden churches used in the past. It refers to the consequences produced on the historical church buildings by the innovative changes in used materials and technologies.

Introduction

"Imbued with a message from the past, the historic monuments of generations of people remain to the present day as living witnesses of their age-old traditions. People are becoming more and more conscious of the unity of human values and regard ancient monuments as a common heritage. The common responsibility to safeguard them for the future generations is recognized."

(The Venice Charter, Preamble)

For centuries wood had been a traditional and a very versatile natural material in the Carpathian region. It had resulted from the geographical and climatic conditions suitable for the growth and the cultivation of the forests rich in quality wood. Because of its qualities, especially its availability, durability and ability to be easily fashioned, it became a universal material for covering of almost all the bare necessities of life of the residents in this region. The most practical application of wood was in building industry. Not only was it used in all kinds of constructions – supporting, dividing, defending or decorative construction, but also in all kinds of typological buildings – from the farm and industrial buildings, trough the residential and representative estates, to the sacral places. The forests of this region were rich not only in the amount of wood, but also in the botanical diversity of the trees – the deciduous and coniferous trees, and the trees with higher or lower amount of resin, which allowed a different approach to its fashioning and specific use.

On the ancient Celtic locality Havranok above the reservoir Liptovska Mara "there is for the first time exemplified the importance of wood = a tree, as a valuable, almost sacred material for building the sacral places in our region: the ideological centre of this cult ceremony place was a tree trunk (a totem) inserted into a rocky foundation near a burnt-burial place, where human sacrifices were offered as well. The colonnades of the tree-trunks led from the both sides to this central dominance, which made together an enticing place with a dramatic effect on the residents and visitors of the settlement."(1)

The animism of ancient pre-Christian Slavs is generally known(2). Supported by the strong inclination to keep the traditions, it represented a powerful barrier against the advancing Christianising. That was probably why during the early period of spreading the Christianity, the Church pursued the rules for building of temples, which preferred more durable (inorganic) material – stone or burnt brick, at the expense of traditional wood. Paradoxically, despite the fact that Slovakia has always been the most forested country in Europe, since the times of Great Moravia the Christian churches have been mostly built from stone (3).

However, several churches were built from wood as well, conditioned by two reasons:

- economical: When the stability of the Christianity was beyond a doubt,

1 GOJDIČ, I.: The wooden sacral architecture in Slovakia, in: PaM 3/1999, p. 2 – 5 (2)
PIETA, K.: Liptovska Mara, Bratislava 1996, p. 81, 110
2 HERMANN, J.: From Hradcany to Vineta, Martin 1973, p. 213 – 215
GOJDIČ, I.: c.d., p.2
3 GOJDIČ, I.: c.d., p.2

the official Church accepted the believers' interest in self-helping construction of churches even from the local impermanent material – wood, mostly in the remote, sparsely populated and economically poorer regions. It was the same with the late-medieval Roman Catholic churches in Hervartov, Zabrezie, Tvrdosin, Trnove and in Rudno of Turec, as well as with the whole group of the younger wooden churches of the eastern rite built in the most forested and poorest regions of North-East Slovakia.

- political: According to the articles of the treaty signed in Sopron, in which wood was permitted to be used as the only building material, the state administration allowed the construction of restricted amount of the Lutheran churches. It was believed they would succumb to time or to the natural catastrophes, weakening the unwanted Protestantism in the Habsburg Catholic Kingdom of Hungary.

It is historically exemplified that around 300 wooden churches have been built in the territory of Slovakia. Wooden churches were present in all denominations: the Roman Catholic, the Greek-Catholic, the Protestant (the Evangelical and the Calvinist), even the Jewish. Denominational and liturgical motives were not taken into account within the selection of the material for the construction of the churches. Because of adverse climatic conditions, unpredictable catastrophes (fires) and mostly the unsatisfactory maintenance of the churches, there has only been preserved a little more than 50 buildings, some of which do not stand on its original place (4).

Cultural traditions

The Carpathian Mountains, unlike the other European mountain regions (the Alps, the Pyrenees, the Scandinavian area), did not have a uniform culture that would be characterised by its typical formal manifestation. The nature in the Carpathian Mountains is similar, and so is the building material and the technologies used for its fashioning. The dramatical mountain ridges and the boundless forests were the unifying and the guiding factor of everything crucial in the peoples' lives of that region – their living, their way of thinking, even the way of building. However, these factors were not sufficient enough for the creation of the solid culture: the Carpathian wooden log-building did not represent an independent Carpathian style.5 Cultures together with their art styles came to the Carpathian Mountains from elsewhere – from the nearby lowland areas: the Russian-Byzantine area (with the centre in Ukraine, north-west of the Carpathian Arch) and the Gothic area (with the centres in Krakow, in Sliezko region, in Spis region and in the mining towns of the Slovak Rudohorie mountains). These two cultural streams were fully reflected in the construction of the sacral buildings – the churches.

Slovakia belongs to the most forested countries in Europe (about 40% of the land is covered with forests). In the past the areas of forests were even more extensive (6). Wood is a material, which has immediately surrounded a man and guided him from his birth to his death. It is the best fashioned and perfectly usable local material. It was only natural to use it in quantity as a building material for all types of buildings and constructions, and formal manifestations.

An ancient log-building of the Slavic inhabitants was the historical foundation of the constructing industry in the Carpathian region. It represented the building archetype, which was affected and shaped by the cultural influences already mentioned. Simple constructing and space principles creatively reacted to the innovative cultural impulses during the long development, producing many different local and cultural variants. These were preserved for much longer then in the open lowland areas because of two factors:

- the sufficiency and availability of the wood material of a suitable quality: local forests provided almost the same profiles of long, even and homogeneous wood,
- the cultural and social location with regard to the central cultural areas:

The Carpathian Mountains were not only a border, but also were the marginal area of the neighbouring cultures, causing a blend of its style elements and the weakening of the influence of the central cultures in this area.

The result was that the traditional log-building technology managed to react on different cultural impulses within 1500 years (7): not only it managed to meet peoples' building demands in all their life necessities (in housing, in work, in defence, or in worshipping), but also it created a number of architectural works of everlasting significance.

Material

As it was already mentioned above, the building material for the wooden churches was exclusively the local material: the long, even wood of the coniferous trees predominated – the spruce (Picea abies), the fir (Abies alba), the larch (Larix decidua), rarely the Arolla pine (Pinus cembra), or the yew (Taxus baccata). As a complementary material for the chosen types or parts of constructions, the wood of deciduous trees was used: the hard wood of oak (Quercus robur, Quercus petrea), or the wood of beech (Fagus sylvatica) used for more stressed parts of

4 Some of them were relocated to the Museums of the Folk Architecture in Nature (so-called "skanzeny"): the church from Zabreze to Zuberec, from Rudno to Martin, from Zboj and Mikulasova to Bardejov Spa, from Matysova to Stara Lubovna, from Habura.to Hradec Kralove in the Eastern Czech Republic. The other churches, endangered by an excessive change of the original locality, were moved into new places: the church from Paludza near the reservoir Liptovska Mara was relocated to the cadastre of the neighbouring village Liptovsky Kriz, where it is fully functional.

5 Written in detail: Mencl, V. (1980), p. 327-336

6 It is similar in the observed region of the Carpathian Moutains and its contact areas.

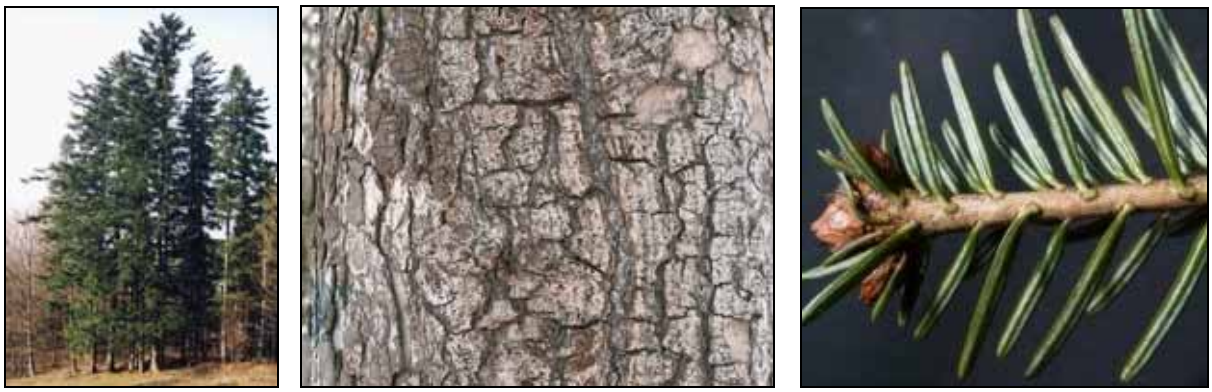
7 From the arrival of the first Slavs in the 6th century till the half of the 20th century.

constructions - fortifying dowels, thresholds, floors, columns, open constructions. The soft wood of the linden tree (Tilia vulgaris) was used for the decorative interior elements.

Abies picea (Fig.1. a,b,c) – a tree that prefers cooler climatic conditions of the Carpathian Mountains. It grows tall up to 30 – 45 m, with the width of 1 – 1,3 m. It has a strait, pole-shaped trunk with a narrow conical crown. The mature wood of the spruce is very bendable and its tensile and stress strength is very high. That is why it is a suitable constructing material in the building industry. It is used in the constructions of the roof structures, as well as for the supporting beams, the flooring, the ceilings and the interior parts of the openings.

1. a,b,c *Abies picea* (Norway Spruce).

Abies alba (Fig.2. a,b,c) – it belongs to the native woods of the Carpathian region. It can grow tall up to 50 m, with the width of 1,5 – 2 m. It has a strait pole-shaped trunk with a cylinder crown. Since long ago it has been used for the functional articles in building industry. The fir wood is very flexible and splittable, and if considering water, it is more resisting and durable than spruce. Its good splitting ability was used in production of wooden roof-covering material: the shingles.



2. a,b,c *Abies alba* (European Silver Fir).

Larix decidua (Fig.3. a,b,c,d) – it is an original European tree, common in the Carpathian Mountains. It grows tall up to 40 m. It has a strait, or slightly bent trunk with a sparse, open crown. Its wood is tough, easily splittable and well fashioning. As a firm, durable and weather resistant material, the wood of larch had been used since the ancient times for the climatically attacked exterior constructions: for the roof structures, for other supporting constructions, for the planking of the wooden buildings, for the flooring, for the staircases, etc.

3. a,b *Larix decidua* (European Larch).


3. c,d *Larix decidua* (European Larch).

Pinus cembra (Fig.4. a,b,c,d) – is a tree existing only in the middle-European mountain ranges, in the upper level of the forests of the Carpathian Mountains and the Alps. It grows tall up to 20 m, with the width of 1,5 m. It has a soft, well fashioning wood containing less of the raisin. It is suitable for the production of the furniture, boarding, and it is used in the wood carving.




4. a,b,c,d *Pinus cembra* (Arolla Pine).

Taxus baccata (Fig.5. a,b) – in the past it was spread over the whole Europe, including the Carpathian region. At present, this tree is rare and is protected by law. It grows tall up to 20 m, with a wide conical crown. Despite the fact that it belongs botanically to the soft woods, its wood is rarely solid, tough and flexible. It is a wood of the middle or high cubic weight. Its texture is fine and homogeneous, and dehumidifies very well. The wood of yew is used for production of sharp profiles; and as it is a very tough material, it is mostly used in the turning with a lathe and the art joinery. In the past it was believed that the wood pest would avoid such a poisonous plant as the yew is. However, the reality is the opposite.

5. a,b *Taxus baccata* (European Yew).

Fagus sylvatica (Fig.6. a,b) – it is spread over the whole Europe, including the Carpathian region. It grows tall up to 40 m, with a wide conical crown. Its wood is of middle hardiness, is heavy and more solid than oak. Its resistance against fungi and woodworm is very low. In the past the beech belonged to the most important building and carpentry wood, mainly for the constructions of floors, staircases and banisters.

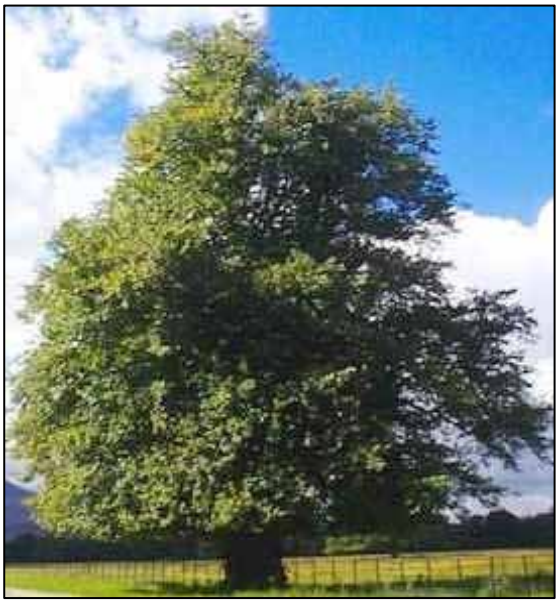
6. a,b *Fagus sylvatica* (European Beech).

Quercus petrea, Quercus robur (Fig.7. a,b,c,d) – these two species are the representatives of the wider genus of oaks, existing in the whole Europe. They grow tall up to 40 m, with widely arranged crown. The oak wood has been valued since the ancient times for its toughness and durability. It is highly resistant against decaying and changing of the water and air appeal on the wood. It was used mainly in the building joinery for the climatically attacked exterior constructions: gates, doors, staircases, thresholds, columns, window and door frames, etc.

Tilia vulgaris, Tilia cordata, (Fig.8. a,b,c,d) – these species are the typical material of woodcarvers. The trunk is straight, on top of which there is a widely arranged spherical crown. The wood is soft, easily splittable and after its dehumidification it does not work any more. It is easily cut, planed, polished and glued. Since long ago it has been used in woodcarving, in sculpture and design; and in building industry it has been used for decorative constructions.




7. a,b,c,d *Quercus robur* (Common Oak / English Oak).




8. a,b,c,d *Tilia vulgaris* (Common Lime).

Construction of the supporting walls.

If we do not take into account the timber-framed churches from the turn of the 19th and 20th century (the import of the architectural patterns from the Alps to the spa centres of the High Tatras), the almost exclusive constructing way was the log-building technology.

This technology belongs to the carpentry group: the oldest technique (8) of adjusting the accessible natural material to the building purpose. The carpentry with its simple tools - an axe, a double-handled knife, a chisel – managed to adapt to the different technological and artistic requirements of the development of the building industry. The log-building technology going back as far as prehistoric times is a typical building of Slavs, and it plays a specific, unforgettable and authentic role in the development of the building industry.

The base of the log-building technology is a "zrub"(9), meaning: a cut-down and axe-hewn log, a beam or a timber (as an adjusted part of a wooden construction within the appropriate dimensions) (10). "Zrub" means as well the wall of a wooden house consisting of the hewed logs, or the whole house built from the hewed timber. The principle of log-buildings is that its construction does not consist of the vertical posts, but of the horizontal beams. The right-angled bonding of the neighbouring walls ensure the equal solidity of the whole building. That is why all the walls of the log-buildings have got the same thickness: the robust – outer and supporting walls and the slender – inner or separating walls are not distinguished.

The log-building beam can have different profiles: either it is left with the circle profile of the original trunk, or it is tangentially trimmed in two opposite levels (Fig. 9a), or it is trimmed in four tangential levels creating a profile of a tetragon (a square, a rectangular, with the cut-down and rounded edges.

9. a,b,c The modification of the log timber: an undressed circle profile, a) tangentially trimmed profile in two opposite levels, b) a beam with trimmed and rounded edges in four tangential levels.

The constructing principle of the log-building is the log bonding of the beams in angles and on the places, where the timbers of two walls crosses. The stability of a building depends exactly on the quality of the timber bonding. In the corners of the neighbouring walls, the single beams are put across each other and joined together by the mortise and tenon joint. The crossed end parts of the beams is hewed-flattened to create a stable contact surface of the cross. Stabilisation of the log corner notch (Fig.10) is achieved by clinching the contact surfaces by the dovetail joint – "rybina" - to avoid the slippage of the crossed beams. Stabilisation of the log bondings is secured with hard-wood nails passed vertically trough the several upper bondings, which prevents the pressure of the roof to push aside the upper parts of the walls.

The log bonding was mostly used in the right-angled disposition of the walls, although it was not exclusive. This technology could be used in the ground plane of the broken line shape (with a blunt or sharp angle), of the polygon shape (near the circle or bow shape), and in the motive of the "retreated wall". The solidity of the log-building was multiplied by the horizontal constructions – with flat ceilings or wooden "vaults" and roof trusses. The ceilings were usually created by the roof beams and covered by planking.

8 A primitive man used a sharp stone to adjust the broken-off branches of trees to prime utensils and tools (a javelin, a handle for a stone axe) for securing the bare life necessities.

9 There are few equivalents to the Slovak expresion "zrub": in Czech - "srub", in Polish – "zreb", in Russian and Ukrainian – "srub".

10 Dictionary of slovak language. V. part (1965), p.720

The height of the walls of one floor was a limiting factor of the log-buildings. It depended on the thickness of the used logs – the bigger was the profile of the log, the higher could be the wall. According to experiences, the height of the walls should not exceed the shorter dimension of the largest room.

Characteristics of the wooden churches in Slovakia.
Supporting structure

The wooden churches in Slovakia are all built – apart from the church in Hronsek – by using the log-building technology. All the possible variants of the log modifications - already mentioned above – are present in there. The log corner notching is created from the strong dovetail joint. The corner line has usually got a straight, vertical course. In Brezany, the logs overhang the crossing in the corners creating the characteristic "wings" (Fig.11). The evangelical church in Hronsek has got a post supporting construction with the vertical planking on the peripheral walls (Fig.12). The planking is done from the inner side of the posts, and so the smoothness of the boards are used in the interior. The post supporting construction is clearly perceived from the exterior, which is visually tectonic by diagonally crossed columns and by horizontal wooden bands. It is believed that this construction is of the Scandinavian origin, but the objective historical documents are missing. This construction is uncommon and unique not only in Slovakia, but also in the Carpathian region.

10. Log corner notching.

11. The "wings" of the protruding logs in the corners are unusual for the sacral buildings (a). They are occasionally present in the churches, which have covered footpath running around them in their ground area (b).
(a) Brezany, (b) Tvrdosin

12. The post construction of the church in Hronsek is unique in the observed Carpathian region.

The post construction was used for the constructions of bell towers, built either near churches or farther away. From the constructing point of view, the towers have always been independent from the supporting constructions of the temples. In some cases, they are optically connected with the body of the temples, which is caused by the functional covering of the church roof and the body of the bell tower.

Foundation constructions

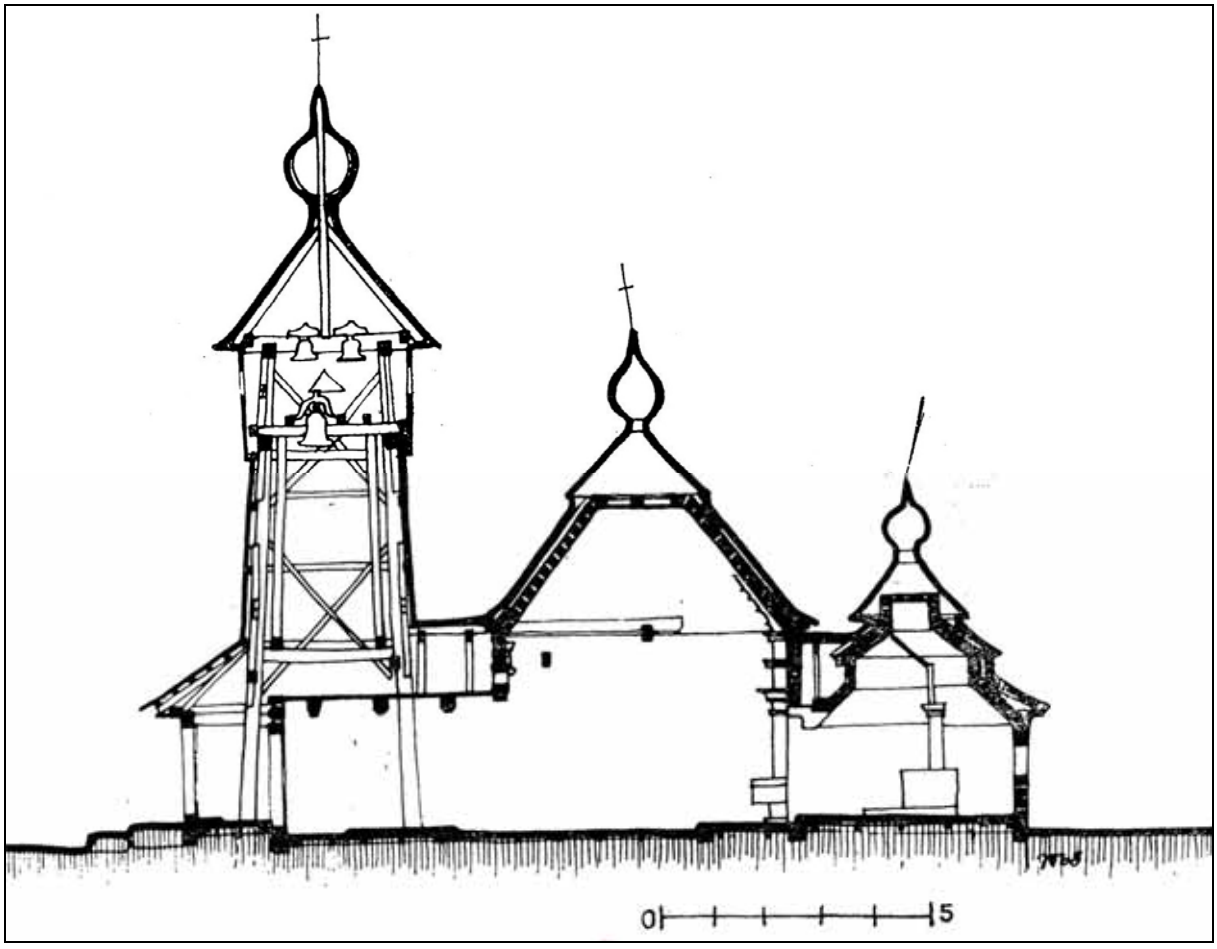
Wooden churches were usually built on the foundations of broken and split rocks, which were laid together either without any connective material, or were joined with clay mortar. Later on, the lime mortar was used. The foundations were laid shallowly in to the ground, and as they were not completely sealed, the place under the floors was aired.
During the course of the 20th century a number of churches were given "foundation" constructions, floors and so-called drainage pavements, made of concrete, with total stopping of air-flow. Consequently, dampness increased in the lower parts of the buildings, which led to their damage by the pathogenic agents. However, there have recently been made some improvements.

Roof constructions

The roof constructions of the wooden churches differs as well. The selection of the type of constructions above the church naves was often influenced by the art and styles of that era. Unlike in other Slovakian churches, in the Greek-Catholic wooden churches of East Slovakia the roofs with the corbelled arch constructions were used (Fig.13). This archaic constructing principle – used in this log building even in the 18-19th century – is functionally very effective. It stabilizes the building in its space and construction, and creates an enticing and mythical place for performing the liturgical ceremonies. The dominated wooden iconostasis – fixed onto the wall separating the main nave from the altar space – supports the strong psychological aspect of this building. The influences of different art styles manifested themselves in the churches of the western denominations as well (the

Roman Catholic and the Evangelical). It was reflected in the construction of the roofs, creating either flat or vaulted ceilings. The flat ceilings were usually composed of beam constructions, covered from its inner side with painted boarding (Fig.14). The church of All Saints in Tvrdosin (Fig.15) has got the roof-beam ceiling with a painted casket boarding construction.

During the Baroque period there were used the vault wooden constructions in the wooden churches as well. Essentially, it is a kind of "beam ceiling of the bow profile": its supporting "beams" are not flat but semi-circled or barrel-shaped. The wooden boarding forms the look of the vaults in the interior (Fig.16).



13. The interior ceiling construction in Jedlinka. (a) section, (b) interior

14. The flat ceiling boarding in:
a) the Roman Catholic church of St. George in Trnove near Zilina,
b) church in Hervartov.

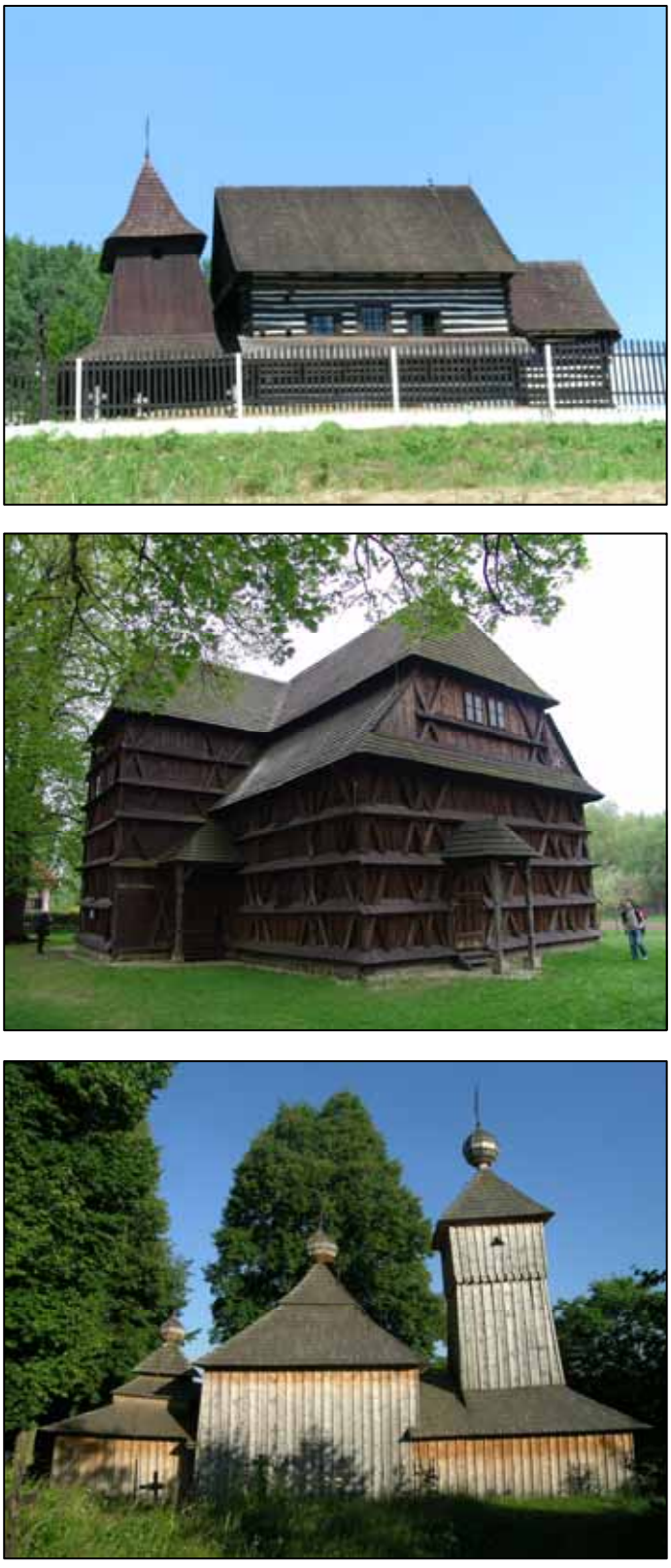
15. The casket ceiling with painted boarding in the church of All Saints in Tvrdosin.

16. The wooden vaults in: (a) the Evangelical articular church in Kezmarok, (b) the late-Gothic church in Hervartov, (c) the Evangelical articular church in Hronsek

Roofs of wooden churches

The roofs of the wooden churches are generally simple. However, they create an enticing feeling of their monumentality in the surrounding area.

A saddle roof is the most commonly used shape. It occurs in different variations with a hipped and gable roof, or with a broach roof (Fig.17). It is usually a high and a steep roof (45-60°). The roofs of the wooden churches in Trnove and Hervartov are even steeper (Fig.18).



17. (a) Brezany, (b) Hronsek, (c) Jedlinka


18. (a) Trnove, (b) Hervartov

Roof trusses of the wooden churches

The constructions of the roof trusses differ – collar beam structures, supporting structures, or individually developed post structures (Fig.19), and enclose the supporting structures of the vaults. Although the shapes of the rafters and other parts of the roof truss are relatively subtle – considering the outer weight of snow – there is not known a single case of the roof collapsing. It is thanks to the steep pitch of the roof.


19. The roof trusses were of different constructions, which included some subtle parts (a) the post construction of the tower in Trnove, (b) Hervartov

20. a The roofing material – wooden shingles – enabled a coverage of different shapes of the roofs and other constructing protrusions of the building, creating so an effective climatic protection. Tvrdosin


20. b,c The roofing material – wooden shingles – enabled a coverage of different shapes of the roofs and other constructing protrusions of the building, creating so an effective climatic protection. Hronsek


20. d,e The roofing material – wooden shingles – enabled a coverage of different shapes of the roofs and other constructing protrusions of the building, creating so an effective climatic protection. (d) Jedlinka, (e) Hervartov.

Covering and roofing material

The covering and roofing material of the wooden churches was everywhere the same: the splinted wooden shingles (Fig.20). All the shapes and profiles of the roofs and of the projected wooden protrusions (entrances, ledges, gates, fencing) were covered with shingles. The roofs often overhung the built area of the church, the reason of which was to protect the ground parts of the wooden walls from the effects of climatic falls, and to create a shielded place for the waiting visitors. In the northern side of the Carpathian mountains (in Malopolsko – "Little Poland") the baseboard part of a church was covered with small roof to protect the bottom parts of the walls (Fig.21). In Slovakia, despite the territorial and climatic similarities, this kind of protection was not used.

21.a Miękisz Stary, Poland: - climatic protection of the ground parts of the walls

21. b,c
(b) Miękisz Stary, Poland: - climatic protection of the ground parts of the walls
(c) Protection of ground log in Hronsek.

Drainage of the roofs

There was no conduit for carrying away water from the roofs (Fig.22), but a drainage system was built around the peripheral walls of a church. During the 20th century, as a part of the church maintenance, iron galvanized sheet had been partially used as a roofing and gutters had been fixed on the edge of the roofs to drain water away. However, these interventions have proved unsuitable in the course of the time, especially the use of gutters, as during the rainy seasons a great amount of water reach the places under the foundations of churches. Consequently, the undermined basement sinks, causing instability in all the supporting constructions. Similar effects creates freezing of water in the basement, which is periodically repeated during the spring and autumn seasons. That is why, during the last maintenance of the wooden churches, only the wooden roofing has been used without any gutters. The drainage system around the churches will be repeatedly repaired.

22. Drainage of the roofs was without gutters, but a drainage system was built around the churches.

Modifications of the surfaces of the wooden constructions and their decorations

The surface of the log buildings was modified in different ways (Fig.23):
a) tangentially hewed beams that created a relatively straight wall were left without any other surface decoration,
b) the gaps between the logs of the circle profile were filled with dried moss, packed with clay and protected with lime coat of paint,
c) the log building construction of the walls was covered by wooden planking
d) the whole log building construction was covered with shingles.

23. a,b The surface of the log-building walls:
(a) tangentially trimmed logs without any further decoration,
(b) the gaps between the logs of the circle profile,
filled with dried moss, packed with clay and protected with lime coat of paint.

23. c,d The surface of the log-building walls:
(c) the log building construction of the walls was covered by wooden planking,
d) the shingle coverage of the log building construction.

24. Surface of the walls of the interiors:
(a-b) without any further decoration (Trnove, Hronsek), (c-d) painted decoration on the wood (Lestiny, Hervartov)

The walls in the interior (Fig.24) were left bare or were covered by boarding. The walls were then left either without any other surface protection and decoration, or they were coated with paint and decorated.

Very significant decoration of the wooden churches was the design of the frame construction of the windows and doors, which was made of hard wood to ensure higher stability and durability of the bonds. These constructions were composed of several parts and their connective bonding created the decoration - its most common use was in the construction of entry portals (Fig.25), or the arches in the interior of the church.

It is necessary to keep these parts authentic (although sometimes in slightly damaged state) during the maintenance and repair of the old wooden churches. They are representatives of not only the artistic and aesthetic expression, but mostly of the whole documentation of the architectural and technical development of men's abilities and ideals.

25. Constructions, framing the openings of the walls of the wooden churches, are beautiful and technically perfect.

Conclusion

There is a number of technical publications about the historical buildings and their development, usually containing dispositional descriptions and information about the regional particularities. However, the basic material characterization, technical and technological context is missing.

Man's creativity can be followed in colourful and dramatical action, the evidence of which is the material and spiritual culture of people. The wooden churches situated in the surroundings of the rich Carpathian forests belong to the source of inspiration for many generations. They represent a durable heritage of values, which have been left for us by a simple, uneducated country man. His own life experiences acquired in coexistence with nature and wisdom collected through the centuries and passed to the future generations, have been included into this heritage. The art stemming from the necessity to create and from the longing for beauty, as well as the inner personal conviction of the existence of a just world is encompassed as well.

The creative ability of people did not have a statical character, on the contrary, it was very dynamic, receiving different initiatives, which later on were reshaped according to their principles and rules. This statement stands, although another feature of the folk culture – its conservatism – is known. It is manifested in clinging to the prevailing traditions, despite the changes in the society. Getting to know the creating process of the ancestors does not include only the descriptions of their final works, but mostly it is based on uncovering the significant connections of the creators and their environment.

It is believed that the results of this project will become the effective device for uncovering the coded knowledge and abilities of the ancestors in the wooden churches, which would contribute to their protection and to the spreading the knowledge of the beauty encompassed in them.

Bibliography

- BANFI, Enrico – CONSOLINI, Francesca: Trees in gardens,in parks and in nature, IKAR Bratislava 2001, ISBN 80-7118-995-2.
- DICTIONARY OF SLOVAK LANGUAGE. V. part (1965), p.720.
- FRICKÝ, A.: Drevené kostolíky na Slovensku. In: Sme. – Roč. 7, č. 6 (1996). – S. 6-7.
- GOJDIČ, Ivan: Drevená sakrálna architektúra na Slovensku. Pamiatky a múzeá.- Č.3 (1999). – S.2-5.
- HÁJEK, Václav: Working with wood, ALFA Bratislava1990,ISBN 80-06-00527-X.
- KRIŽANOVÁ, E.: Drevené kostoly. (Dedičstvo našich predkov). In: Krásy Slovenska. – Roč. 76, č. 5 – 6 (1999). – S.12.
- ONDREJKA, Kliment: The small lexicon of the Slovak folk culture. The map of Slovakia Bratislava, Ltd., Bratislava 2003, ISBN 80-8067-002-1.
- PUŠKÁR, I.: *Drevené kostoly na Slovensku. Ľudové staviteľstvo v karpatskej oblasti.*, p. 398-402.
- Mr: Krása drevenej architektúry. In: slovenské stavebníctvo. – Roč. 2, č. 9 (1997). – S. 36.

The Wooden Church of St. George in the Village of Trnove

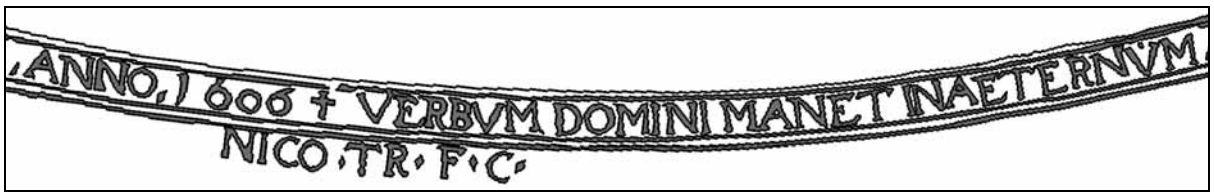
Zuzana Babjaková
Faculty of Architecture, Slovak University of Technology

1. THE HISTORY OF THE VILLAGE AND THE WOODEN CHURCH OF ST. GEORGE

The village of Trnove is situated in the region of Zilina. It is distant approximately 7 km to the north-east from the historical centre of Zilina. The village is mentioned in the historical documents several times: in 1393 as Tharnow, in 1474 as Thernowe and in 1598 as Trnowe. In the 16th century the village was a part of Lietava domain. In the coat of arms of Trnove there was a two-storey tower with an onion-shaped roof ended with a spike.

The inhabitants of the village were occupied with sheep breeding, bee-keeping and pottery. In 1784 there was 425 inhabitants in the village of Trnove, in 1900 there was 617 inhabitants and in 1980 the number of inhabitants increased to 2018.

Since 1970 Trnove has been a part of the town Zilina, attached to its north-eastern periphery. The village is the type of a regular structure housing built alongside the thoroughfare, copying the flow of the stream in the mild valley. The rest of the streets are situated in parallel to the main road. The Roman Catholic wooden church of St. George is located on the north-western border of the village, on the hilltop of the cemetery area. It was probably built in the second half of the 16th century. This dating is based on the dates preserved on the bells in the church tower, however these data have not been historically supported by any documents. It means that the bells could have been relocated to the church of St. George from a different sacral building. There are two bells in the church tower, one of which dates from 1604, the other one from 1606.



1. writing with dates on the circumference of the bell

There are two narrow windows, vertically divided by forged metal bars and with wide wooden frames, on the south wall of the nave. The bars are created from vertical sticks with bended thorns. There is an inscription "?10 Anno 1776 MKPC" engraved on one of the bars, while on the other one there are only initials "M.L.". This dating from 1776 probably specifies the date of the later renovation of the church and the bell tower, which is built in front of the main south-west façade of the church. According to the document from the canonic visit, the church was excessively renovated in 1826.

On the 5th of November 1963 the church of St. George was declared according to Law „on the protection of Monuments and Historic sites" No.20/1987 as a Cultural Heritage Monument. In 2002 it became a National Cultural Heritage Monument according to Law "on the protection of the Monuments and Historic sites" No.49/2002 and it was recorded in the Central Register of the National Immovable Cultural Heritage Monuments: No.1384/0.

During the course of the twentieth century the church of St. George had deteriorated into poor technical condition, which required several rescue interventions. They were mostly carried out in an unsuitable way, partially without the evaluation of theirs efficiency. During the 60s of the twentieth century the frame construction of the tower had been reinforced by a steel construction, which copied the shape of the tower from its inner side. The profiles I and L were shaped at the site and welded together according to the deformed shape of the tower. A construction for three bells (two historical bells and one from the 20th century) was fastened to the steel construction on the highest floor of the bell tower. The most extensive statical repairs had been done

during the years of 1992 and 1993, when the church was reinforced by the outer supporting beams and the inner supporting steel construction, which was placed between the bearing beams and the posts of the bell tower.

The church has been the property of the Roman Catholic Church, which, as an investor, had a new church built in 1994 near the cemetery area (on its south-west side). As it was built in brick and with much bigger capacity, the services has been mostly held in there. Since that year the wooden church of St. George has been dysfunctional, without its use and investments for its repair.

2. a metal window bar

3. the view of the entire area

2. ADMINISTRATIVE DIVISION AND ENVIROMENTAL CONDITIONS

4. The administrative division of Slovakia

WGS84:

18° 47` 19.77`` E

49° 11` 39.22`` N

Cadastral number : *1275 (the cemetery area and the area under the building have the same number)*

Cadastral Unit : *the village of Trnové, the town area of Žilina, the district of Žilina the date: 1996*

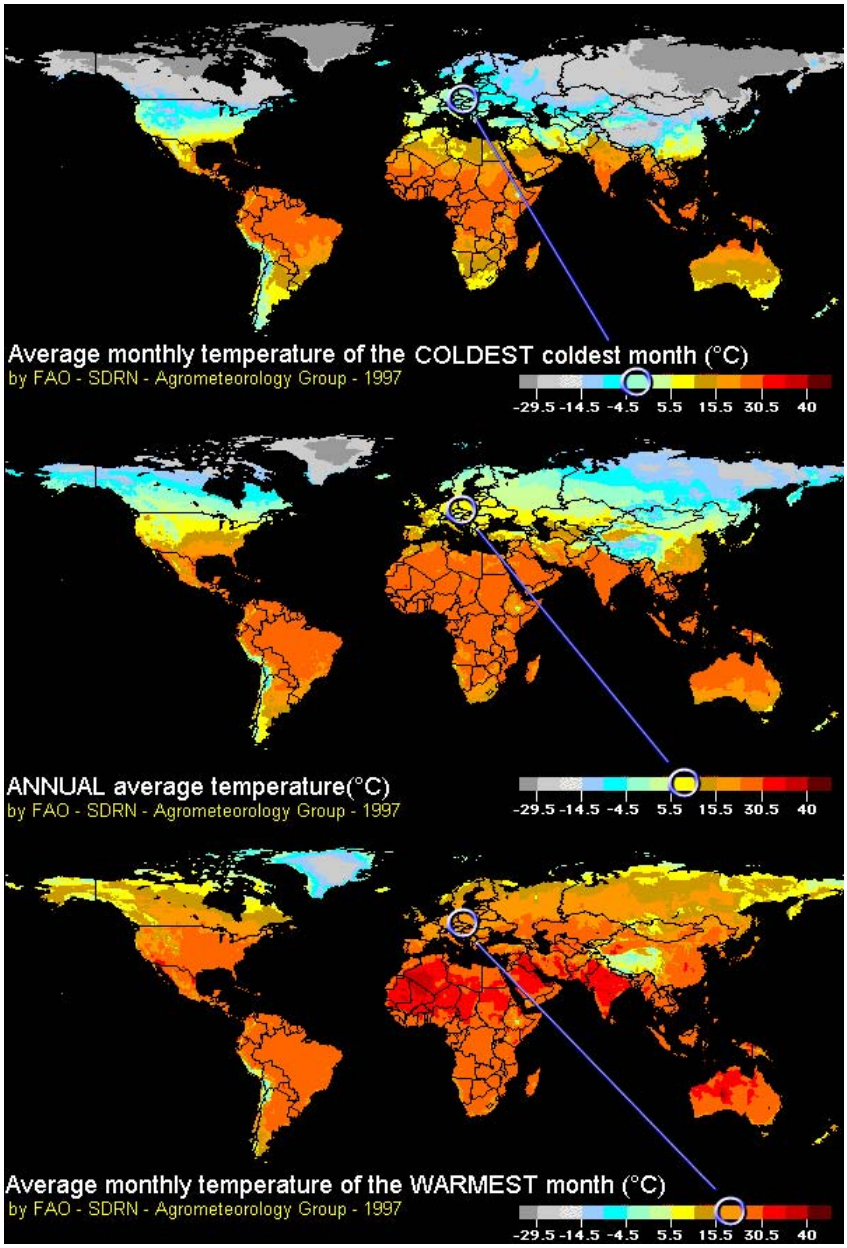
The village of Trnove is 325 metres above sea level and the historical centre of the town Zilina is 345 metres above sea level.

After the Koeppen Climatic Classification System - Class C: Temperate

Winter: the relative humidity is around 85%, the snowfall = snow layer is 10 - 100 cm and the temperatures below 0 C° lasts for 5 months a year, the temperature range is from -18 C° till +2 C°, the coldest month is January.

Summer: the relative humidity is around 40%, the temperature range is from +10C° till +32 C°, the warmest month is July.

Slovakia is situated in the northern temperate zone with the regular change of the four seasons. The transitory influences of the continental and oceanic climate manifest themselves in dry weather, which is reflected in hot summers and very cold winters. The oceanic air brings rains and mitigates temperatures. Temperature inversions, mainly in the spring and autumn season, when the cold air rests in valleys and it is sunny on the mountains, are typical for the valleys in mountain areas like the Zilina valley with its neighbouring valleys. The summer monsoons (the overcast weather with high rainfall) usually prevail in June and July. The diversity of the Slovak territory causes the distinct weather differences in the regions. The Zilina valley belongs to the climatic temperate zone, including the highlands and lower mountain ranges of 700-800 metres above sea level. The rainfall per year is from 600 till 1200 mm. The snowfall forms approximately 20% of the total falls per year. The number of summer days (meaning: with the temperature 25C° and above) per year is under 50.



The climatic factors of relatively humid and warm summers create suitable conditions for the life and reproduction of divers species of pathogenic agents like fungi, moulds and bacteria, as well as wood pests.

5. Climatic conditions

While in the hot summer weather the surface of wood is exposed to the UV sun rays and consequently to its dehumidification, in the cold winters the wooden constructions are statically overburdened with thick layer of snow and wind. The changes of temperatures during the snow melting and its consequent freezing cause damage of wood by the expansion of ice in the gaps of constructions, dampness and sinking of the foundations.

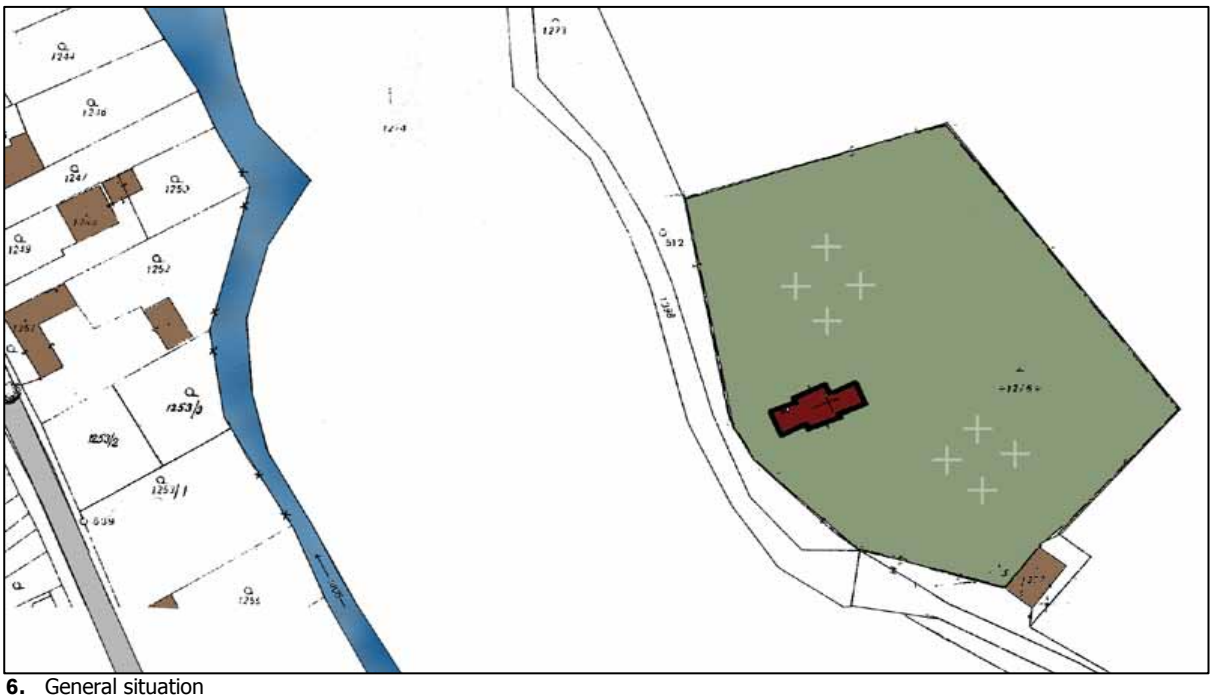
The spring floods, caused by melting of snow, and the summer rains endanger the stability of the slope above the stream, on which the wooden church has been built. The higher is the volume of the rains, storms, gales and the changes of the weather, the higher is the risk of the soil erosion. The global warming will have been reflected in our territory by the increase of the average of air temperatures from 2C°- 4C° by the year 2075.

The regular snow cover will occur only from 900 meters above sea level. The introduction of new biological species and pathological agents from the warmer areas is the most negative expected consequence of the global warming in Slovakia. The climatic changes can cause the shift of the vegetative zones from 200-300 meters to the north and 150-300 meters to the height. The change of the bio-climatic conditions will be more favourable for the deciduous trees, meaning that the traditional areas of the spruce wood will be endangered. In history commonly used coniferous building wood might become inaccessible and consequently the knowledge of its trimming (the carpentry techniques and technology) can loose its quality.

The weather conditions are closely connected with another factors and risks of wood damage, like smog (the motorway near Zilina), the emissions from the factory zone near the town of Zilina and its surroundings (the production of paper using bleach: chlorine, hydrogen peroxide; the brick fields, the cement works, the poultry farms, the car industry).

3. CONCTRUCTIONS

General situation: The wooden church of St. George is one-nave log building situated in the middle of a cemetery. The church with its lengthwise axis is orientated vertically on the fall line of the slope in the direction of the southwest - northeast. The graves are located from three sides of the church in a distance of 2-3 meters from the building. There is an asphalt road in front of the building. In this part of the cemetery the distance of the graves from the church is 5-6 meters, and they are close to a fence and a terrain disruption. There is no other building in the cemetery area. There is an old mourning house and a new church in the wider cemetery area, and a ground for the possible use as a storeroom during the reconstruction works. A dysfunctional electrical cable connection is led to the church. There are high trees situated 10-15 meters from the church, but no other registered protected building or verdure is present in the cemetery area.

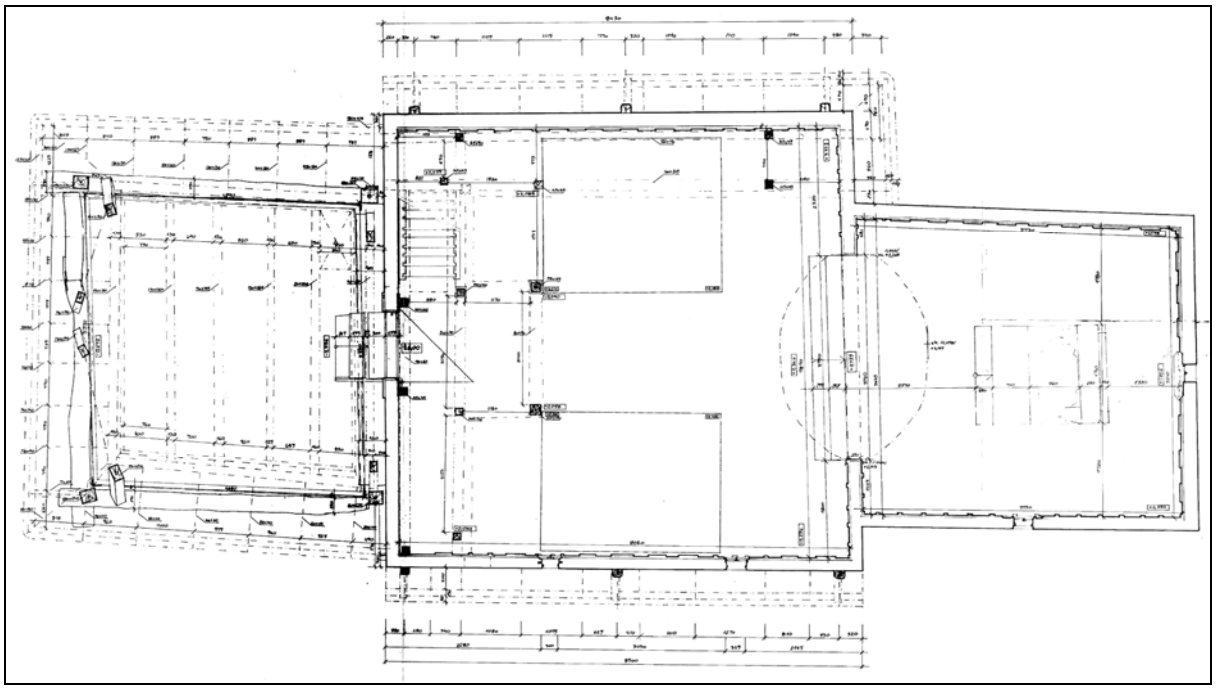


6. General situation

The disposition of the church: According to the constructional and architectural style of the church, it could be ranked among the wooden churches of the Gothic characteristics. The shorter nave has almost square ground plane. The presbytery with a straight stopping is slightly lengthen, and separated from the nave with a simple arch without ornamental decoration. The church is without a sacristy.

The interior of the church: The interior is vertically covered with boards. The part of the interior is covered by unsuitable materials (PVC) to prevent the leakage of heat through the gap between the wooden beams to the exterior. There is a wooden choir on the western and northern wall of the nave, accessible from the staircase situated next to the entrance. The ledge of the choir is wooden without any decoration, apart from the rimmed board with the carved curvelike decoration. The roof beam ceiling is covered from the upper side by boarding, but only the bottom side of the boarding in the presbytery is painted with the Renaissance decoration from the first half of the 17th century (the plant acanthus motive in the form of the curvelike

shapes). The restoration of the interior would become a part of the third stage of the reconstruction works. The floor in the nave as well as in the sanctuary is wooden (the wood board flooring), and in the space under the tower it is made of stone (a sandstone). The inseparable part of the interior is the altar of St. George with sculpture decoration (necessary to be restored) and other movables.



7. The ground plane of the church

The log building and the bell tower: The hillside, on which the church is built, declines to the southwest. The log building had previously had the shallow stone foundations, replaced in 1992-1993 with the concrete base. Concrete was used as well for the reinforcement of a conduit cut in the terrain, running around the church from the three sides. Although this intervention has stabilized the church on the hillside and enabled the better flow of the surface waters away from the building, it consequently created suitable conditions for decay and growth of the moulds in the wood of the log building. The bottom parts of the beams are strongly destructed by dampness (caused by the layers of snow, the rising dampness from the soil, the squirting water). This problem is very distinct near the northern and eastern façade, which have only a small area exposed on the sun, that is why it is impossible to dehumidify it.

The log building of the nave and of the presbytery is connected together with a dovetail joint, which on some places is not realized properly, and so creating the deformations of the church.

8. The interior and the movables of the church

9. The conduit around the church
10. A corner deformed by the beam shift

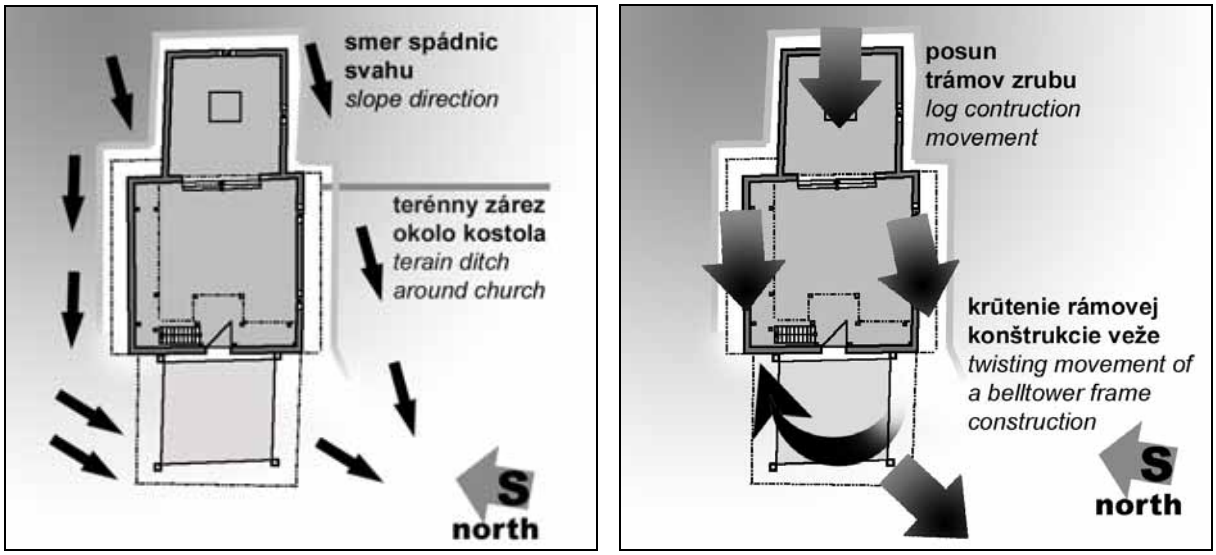
The beams of the log building, the bearing and non-bearing parts of the ceiling and the roof trusses are made from coniferous wood (spruce, fir). The roof truss above the main nave is supported by posts, and above the sanctuary there is the strutted collar beam roof structure used.

The detached bell tower has a simple square ground plane. The bell tower is built from the frame construction carried by four posts in the corners. It is vertically covered with boarding and ended with a small pyramidal roof. There is a saddle roof above the nave and presbytery. The walls of the log building are covered up to their middle height with a small roof running around it. All the roofs are covered with wooden shingles put in a single layer. A narrow band of a tin-plate is placed under the shingles in the crossing levels of the roofs.

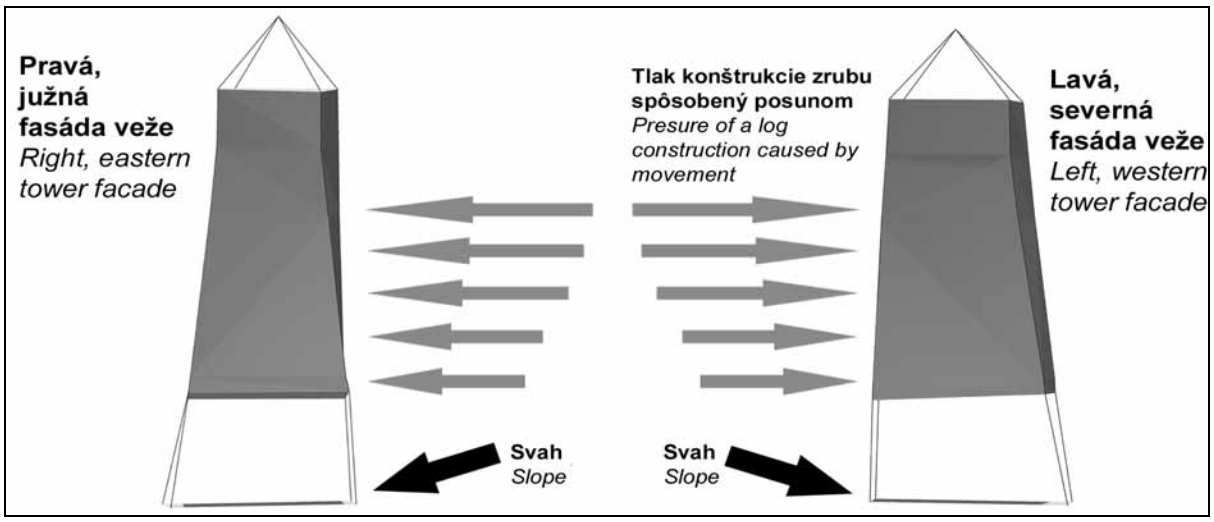
11. A roof truss, the sections

4. TECHNICAL STATE OF THE BUILDING, DAMAGE FACTORS

Deformations caused by the shift of the hillside and by the type of the construction: The construction of the log building and the beam structure copy the shape of the hillside and that is why they are subject to deformation, slightly moderated by the dovetail log corner notching. The joints have not always been properly created, or they have got damaged by its degeneration. The beams shifts in the surface gaps of the log building westwards, copying the fall-line of the slope. The log building is overburdened with the steep roof (the weight of the roof truss, the snow, wind). The construction of the church is strongly supported, and so as a whole it seems to be statically without deformations. The whole roof structure above the nave and the presbytery shifts together with the damaged enclosing timbers of the log building.



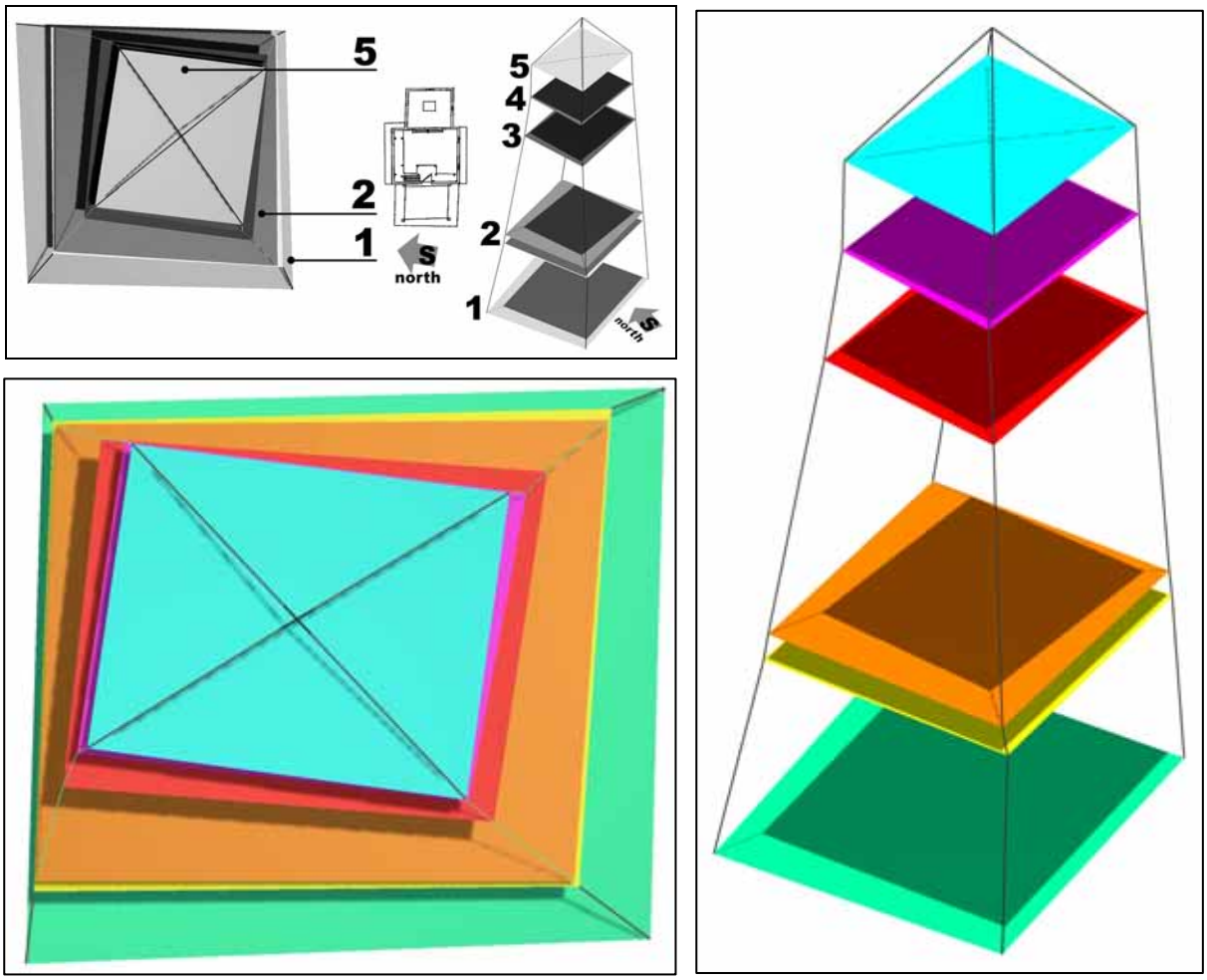
12, 13. Schemes, visualisations, the schemes of the forces, deformations



The most distinct indicator of damage is the frame construction of the bell tower. Its shifting along the fall-line of the slope creates the pressure forces, which effect aside the axis of the frame construction of the detached bell tower. Even the original ground plane had an irregular square shape, adjusted to the terrain. It can be seen on the lowest floors, which are deformed partially thanks to the fastening of the construction to the threshold frame construction. The pressure of the log building increases along the height of the tower, mainly from the front side onto the right southern part, and causes the rise of the turning moment. The floors : the solid frames reinforce the tower, while the four diagonal posts between the floors are striven by turning. That is why, with the rising height of the construction, the ceilings in the frame construction are twisted clockwise.

Dampness (pathogenic agents: fungi, moulds and pests): The dampness of the wooden beams ranged from 17 to 23% during the survey carried out in the relatively dry season (July-August 2006). According to the survey carried out in 1999, dampness of the beams is around 30% during the more rainy seasons of the year (minimum 7 months of the year). The dampness of the roof trusses and beams ranged from 15 to 19%. The

critical level of dampness necessary for the activity of the pathogenic fungi (STN EN 335-1) is 20% and more. The dampness of the roof beams, roof trusses and interior boarding is under the critical level of their endangerment by the pathogenic fungi. The dampness of the log building beams (mainly the ones in the foundations) is above the critical level. The dampness of the parts of the church construction is above the critical level as well, which is necessary for the activity of the wood pests in the building wood: for the House Longhorn beetle (Hylotrupes bajulus L.) and the woodworm (Anobium spp.). The activity of the larvae of the wood pests in the church can not be eliminated even above the level of only 10% of dampness, although the highest activity is expected around 30% of dampness. In the bio-damaged parts of the building, there have been found the small holes of the oval shape caused by the larvae of the House Longhorn beetle (7 x 12mm), the holes of the circle shape with the diameter of 1-3 mm from the woodworm, as well as the wholes of the circle shape with the diameter of 5-8 mm from the Horntails (Siricidae), and the pathogenic fungi (Gloeophyllum trabeum), which causes the inner decay of wood. The survey of the interior could not have been carried out in the necessary way as the beams are covered with wooden boarding. It is necessary to update the survey of the interior before the reconstruction of the church.



14, 15, 16. Schemes, visualisations, the schemes of the forces, deformations

5. THE RECONSTRUCTION PROPOSAL

The main points of reconstruction:

1st STAGE:	1) Preparatory works
	2) Stabilization of the slope
	(the impediment of the soil erosion and the shifting of the slope)
	3) Foundations, drainage system (the impediment of the church shifting)
2nd STAGE:	4) Stabilization of the building (exchange and support of the structure parts, the fillings)
	5) Statical stabilization of the whole church construction
3rd STAGE:	6) Exchange of the roof covering, floor and boarding renovation
	7) Engineering network (electrical installations, the fire and security alarm system)
	8) Restoration and renovation of the interior and the movables and their installation

1st STAGE

Preparatory works: The church is the part of the cemetery area. As the graves are situated in the close surroundings of the church, it is necessary to protect them with boarding or foil covering up to the distance of 20 meters from the building. It is equally necessary to cover the high greenery situated in the cemetery area with boarding. The reconstruction of the church will not require the manipulation with the engineering ground network, neither with the roads and watercourses. However, during the manipulation with the long parts of the log building construction there could be a short-term disruption in the local traffic.

The church is dysfunctional at present, and after the professional dismantlement of the decorative parts of the interior, it is prepared for the reconstruction. Before the beginning of the reconstruction it is inevitable to dismantle the bells from the tower and place them temporarily to a deposit, as well as to elaborate the program of renovation of the interior fixtures and fittings. It should define the way of their dismantlement (by a professional), their transfer, their protection at the site (if their dismantlement is not possible), their security in the deposit and suitable conditions (temperature, humidity, light), as well as evolve the right policy for their renovation or restoration. During the whole work it is inevitable to follow the code of practice supported by Law (49/2002 on the protection of Monuments and Historic sites) in cooperation with the state administration and organisations.

17. The view of the whole building

Stabilization of the hillside: During the first stage of renovation of the church of St George in Trnove it will be inevitable to construct the supporting structures and the stabilization of the hillside by the geo-grids and anchoring. The low greenery and the tree stumps will be removed during the building of the supporting wall of the parts of the existing fence. The stabilization of the slope and construction will have to be carried out effectively but without the visual intervention, which would devalue the cultural monument.

Foundations, drainage system: The realization of new foundations of the church should be a part of the reconstruction. The foundations of the bell tower could be supported by the micro-piles. The shape of the drainage ditch would be modified on its outer side. It is expected that the soil is of the loam texture. The removed soil will be replaced by gravel. All these interventions would stabilize the foundations of the church and ensure against its shifting down the slope.

As there was not found any effect of the subsoil waters during the survey, the damage of the wooden construction had been caused by the surface water, squirting water and snow. As a solution to the elimination of the negative effects of water is the drainage system in the interior and exterior, and the gravel dike is suggested as well.

2nd STAGE

The reinforcement of the whole construction would be a part of the second stage (the dovetail log corner notching, the replacement of the bottom logs, filling and sealing of the damaged parts, the replacement of the shingles roofing, the elimination of the unsuitable statical intervention- the slanting supporting exterior beams). The aim of this reinforcement is to prevent other deformations, and not to renovate the church into its original state.

The parts of the log building, which are highly damaged by a decay and pathogenic wood pests, will be replaced by the new ones. The new wooden material, used for the renovation of the beams, fillings and shingles, will be chemically treated. Partially damaged parts will be repaired by fillings of the same type of wood as the original is, or by "injecting" method. The parts of the log building and its construction will be manually dismantled by professionals using a proper statical support for the construction. The dismantled damaged parts will be immediately taken away for its liquidation, as their storage at the site or nearby area could be a source of contamination for other wooden parts, the new wood material and for the gravel dike under the floors as well.

It is necessary to check the insulations, or to create the new ones, to prevent the dampness from its rising into the construction (it is possible to create an air gap or to use the hydro-insulation). All the parts would be protected with the appropriate insecticides and fungicides, and according to the fire risk, there will be used a transparent chemical coating to make the wood fireproof.

The stabilization of the whole building would include the reinforcement of the collar beam roof structure above the presbytery (with the steel tightening bends, or the traditional wooden "St. Andrew's crosses"), the

reinforcement of the log building and the bell tower. There is a number of different ways of statical stabilization, and it is only a question of a methodological decision, which system should be used. One of the extreme possibility is using of exclusively traditional technologies, meaning the substitution of the old damaged parts for the new ones according to the logic of the construction. The negative result would be that the substituted parts could give a false impression, that they are the original components of the construction. The other extreme is the use of exclusively new technologies: the reinforcement with steel tightening bands, or the steel and fibreglass supports inserted into the wooden material. The negative side of it is that its latent use would not be possible to secure, as they would not be exposed. That is why the negative effect of these heterogeneous materials in the wooden constructions can not be eliminated. In this climatic conditions the contact of the wood and steel is not possible, as during the fall in temperatures the condensation of atmospheric moisture on the metal surfaces causes excessive damage of wood and consequent attack of the pathogenic wood pests, fungi and moulds.

3rd STAGE

The 3rd stage is dedicated to the interior renovation and to the replacement of shingles (the substitution of damaged flooring, the installation of renovated movables, the restoration of the Renaissance painting on the ceiling of the presbytery). The presentation of the interior would be subordinated to its new function. The church would be connected to the new engineering network of electrical installation, and fire and security alarm.

THE NEW FUNCTION OF THE CHURCH

The wooden church of St. George has been dysfunctional since 1994. The renewal of its sacral function is not expected, as the Church has invested into the construction of a new church with much bigger capacity and better equipment in the nearby surroundings . The church of St.George has not been maintained at all, and its owner - the Roman Catholic Church - does not even intent to realize its complex restoration. The church is little known in the village of Trnove and is perceived as a burden, the renovation of which the inhabitants are not willing, by means of the municipal and church contribution, to support. The church is not sufficiently known and propagated for the tourism, and is not possible to be open for public as for its bad condition.

It is suggested that the ownership of the church should be conveyed to the state, where the autonomous region of the town Zilina would become its owner. It would be possible to finance the renovation of the church, its consequent presentation and sacral use from the funds of the Higher Administrative Land Unit. A very good example in this sense could be the Roman Catholic wooden church in the town of Tvrdosin. The church had become a property of the Town of Tvrdosin, and in 1993 it was awarded with the prize Europa Nostra for its reconstruction. Since than, the church has been an exposition of the museum - an exhibit with preserved original movables and altars, and restored decoration. At the same time, occasional services are held in there during the significant feasts.

After the reconstruction of the church of St. George, it could be used for the chamber concerts of sacral music, for the installation of folk wooden sacral sculptures or objects connected to the history of the village, as well as for the exhibitions of the local artists, etc. In the context with the new church, it could create a spiritual centre of the village of Trnove.

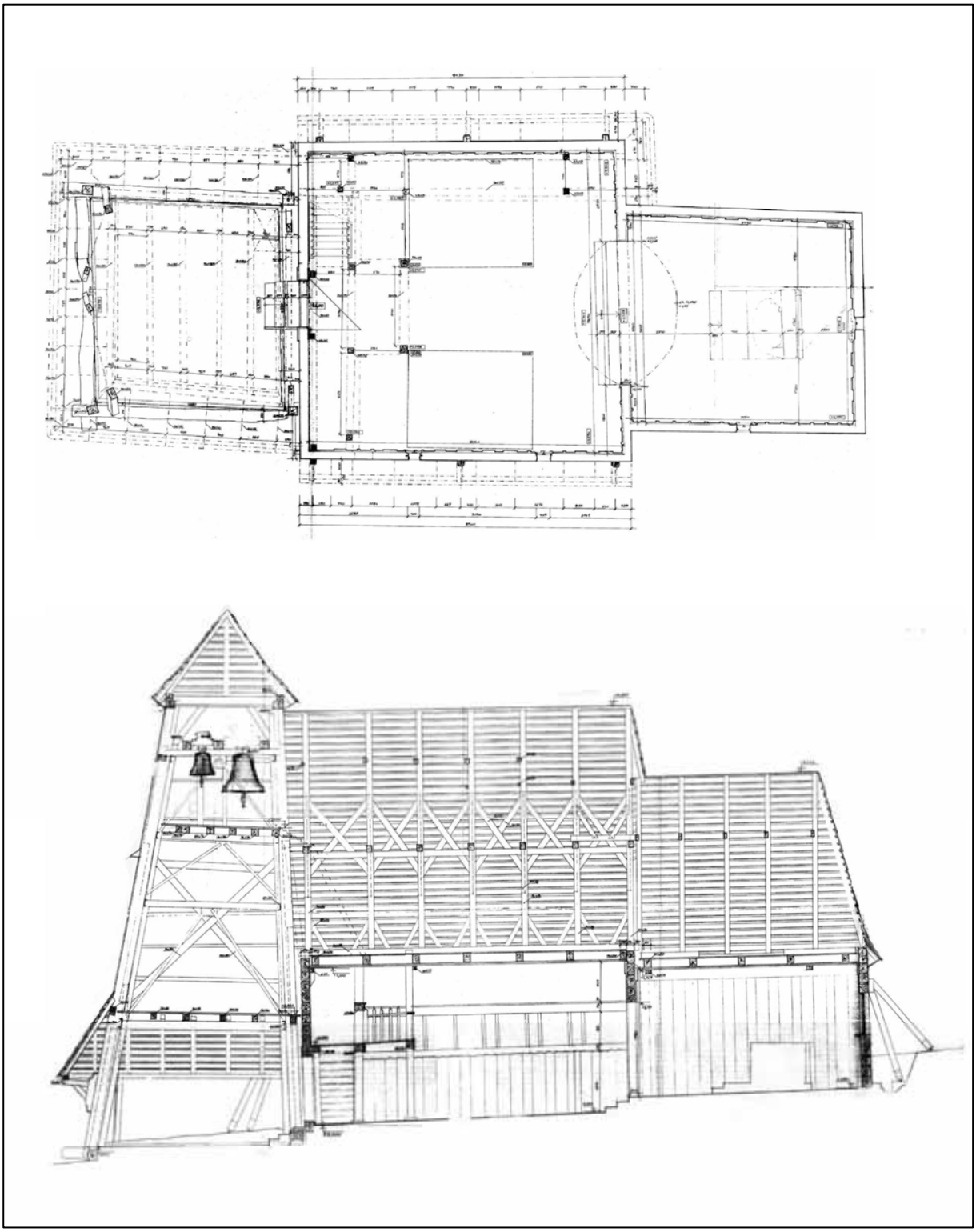
The most important intervention into the existence of this gem of wooden architecture is a thorough, professional and well-considered reconstruction that would enable its dignified presentation and preservation as a historical monument, as well as an attractive place for the visitors of Slovakia.

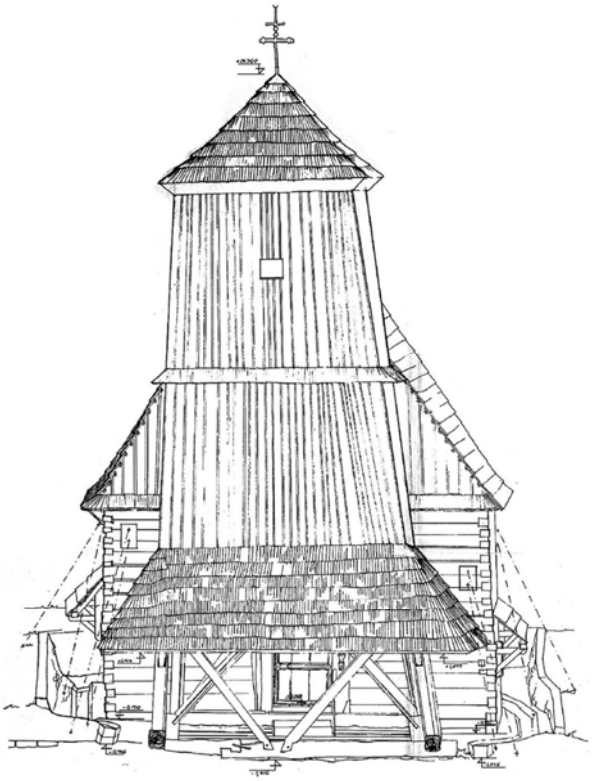
Photo : *author`s archive and Ing. arch. B. Polomova*

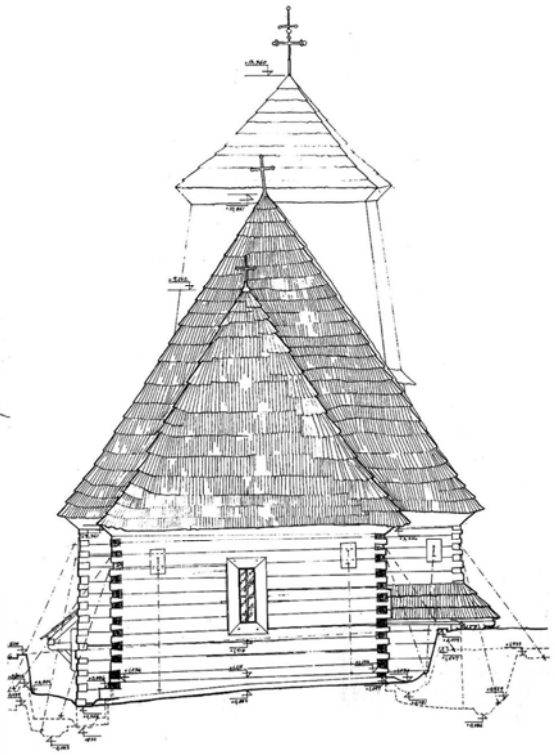
Bibliography

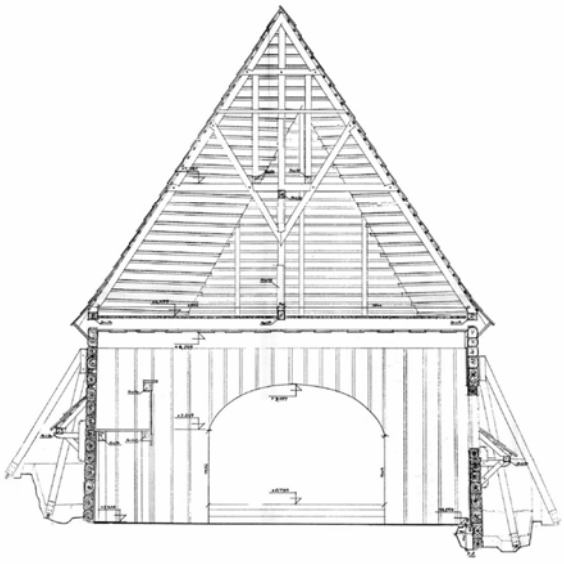
- Zameranie existujúceho stavu m – 1 : 25, 1 : 10, *Present state project,* Ing. arch. J. Babjak, Ing. arch. Z. Babjaková, Žilina 1999
- Znalecký posudok 13/1999 – skutkový stav poškodenia drevených prvkov v drevenom kostolíku sv. Juraja v Trnovom a doporučenia na výmenu alebo opravu poškodených prvkov vrátane návrhov na chemické ošetrenie. Prof. Ing. L. Reinprecht, CSc., Zvolen 1999. *Expertise 13/1999 - existing condition of damage of the wooden parts of the church of St.George in Trnové and recommendations for the replacemrnt or repair of the damaged parts, including the chemical treatment suggestion.*
- FLORIŠ, E.: Drevený kostol v Trnovom. Interný materiál rk. farského úradu v Rosine - *Wooden church of Trnové. Internal information material of Roman Catholic church in Rosina.* (The author was a Roman Catholic priest in Rosina church district in 1987 – 1997).
- Drevené kostolíky na Slovensku. *Wooden churches in Slovakia.* Bratislava: Správa kultúr. zariadení MK SR, 1992.-56 s.
- Pfiliegel, M., Krušinský, G.: Premeny Žiliny. *Changes of Žilina town.* Vydavateľstvo OSVETA, Martin, 1990.-135 s.
- Kolektív autorov : Súpis pamiatok na Slovensku. *List of the historical monuments of Slovakia.* Vydavateľstvo OBZOR, Bratislava, 1969.-324 s.
- Leemans, R. and Cramer, W., 1991. *"The IIASA database for mean monthly values of temperature, precipitation and cloudiness on a global terrestrial grid".* Research Report RR-91-18. November 1991. International Institute of Applied Systems Analyses, Laxenburg, pp. 61.
- Lieth, H., 1972. *"Modelling the primary productivity of the earth. Nature and resources",* UNESCO, VIII, 2:5-10.

The Church of Trnove: Drawings









Carpentry tools
Tesárske nástroje

Zuzana Babjaková
Faculty of Architecture, Slovak University of Technology

Wood belongs to the most used buiding material since beginning of evolution of mankind. The very first hunters homes were build from bones, furs, stones and tree branches. Basic tool for buiding – axe was not only a meaning of a work. At least since the late Neolithic, elaborate axes (battle-axes, T-axes, etc.) had a religious significance as well and probably indicated the exalted status of their owner. Certain types almost never show traces of wear; deposits of unshafted axe blades from the middle Neolithic may have been gifts to the gods. In Minoan Crete, the double axe (labrys) had a special meaning. In times of mediterranean nations also other skillfull carpenters are known. Homer mentions in Odyssey a special axe which Ullysess used, when he buit famous wooden bed for his wife Penelope. Axe could also carry a symbolic meaning, not necesarily only religious. In the Roman *fasces*, the axe symbolized the authority to decapitate.

Axe remains as the basic tool till today, used in endless variations of a shape and size. The earliest examples of axes have heads of stone with some form of wooden handle attached (hafted) in a method to suit the available materials and use. Axes made of copper, bronze, iron and steel appeared as these technologies developed. Axes of peculiar shapes are tools for specialized work e.g. for making barrels, wheels, helping to cut masonry or for specialized carpentry work. As buiding technique develops there is growing need for variety of quality tools, saw, plane, drill and many more are used. Various kinds of saws were cutted to stone reliefs from time of Roman Empire. The most of this tools are almost the same nowadays as they were several centuries ago.

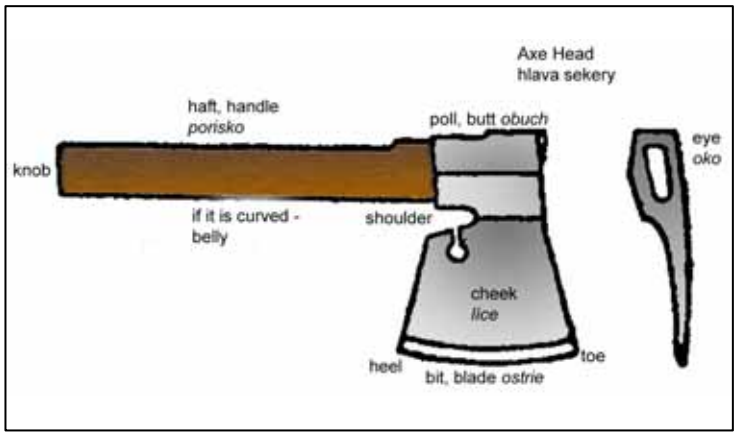
Time of industry revolution destroyed many skills and carpentry knowledge. Beautifull and cleverly crafted wooden constructions of 18th and previous centuries often dissappear, because there is lack of skilfull repair and knowledge of a proper carpentry techniques.

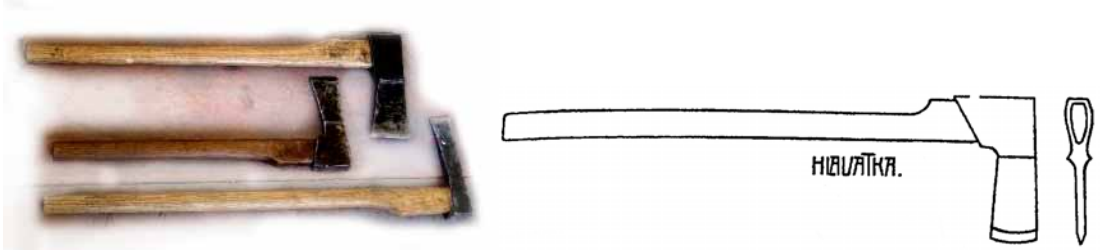
This annex contains only a schematic list of main types carpentry tools used in Slovakia. They were used at the whole territory, but often they had a specialized local folk name, but shape was almost the same. All translations in "" are ment only for basic orientation and comprehension, they couldn`t be regarded as a proper terminus technicus.

AXE *Sekera*

The **Axe Head** is typically bounded by the *bit* (blade) at one end, and the *poll* (or butt. Either side of the head is called the *cheek*, which is sometimes supplemented by *lugs* where the head meets the haft, and the hole where the haft is mounted is called the *eye*. The part of the bit that descends below the rest of the axe-head is called the beard.

The **Axe Haft** is sometimes called the handle. Traditionally, it was made of a resilient hardwood like hickory or ash. The *shoulder* is where the head mounts onto the haft, and this is either a long oval or rectangular cross-section of the haft that's secured to the axe head with small metal or wooden wedges. The *belly* of the haft is the longest part, where it bows in gently, and the throat is where it curves sharply down into to the short *grip*, just before end of the haft, which is known as the *knob*.



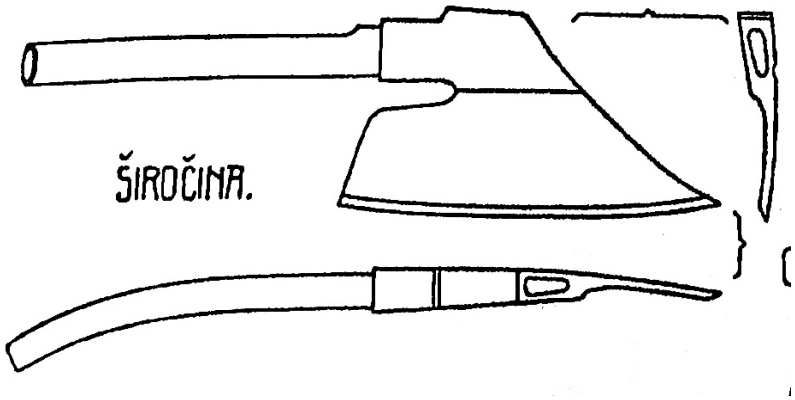


Carpentry axes - basic

Hlavatka ("head" axe) – is used for work with timber in the wood for cutting, carrying, and other manipulation - twisting logs, moving etc. In the past building wood was transported from northern regions of Slovakia by rivers. Wood beams were fixed together to form a raft and carried downstream to saw or market sites. Hlavatka axes were used also as a help tool of craftsmen.

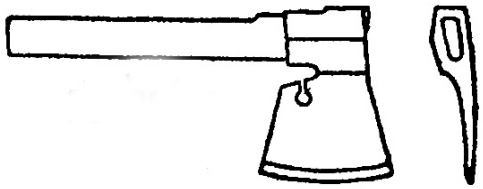
one-handed broad axe

right broad axe



Broad axe - ***Širočina*** is another common axe type. Broad axes are used for cutting sides of a logs (circular in a section) to beams, ready for building (rectangular shaped section). Broad axes are so called right and left (curvature of cheeks), depending of which side of a log is worked on.

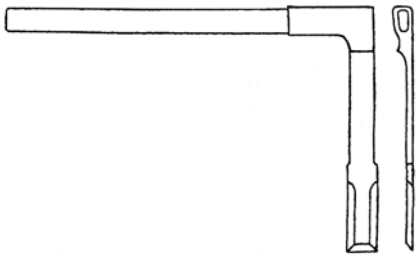
Bearded axe - ***Bradatica*** is medieval type of broad axe with long beard of an axe head and ussualy a much longer haft. It was used for multiple purpose, to cut wood and also to shape it.



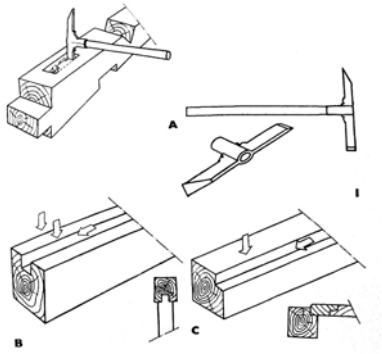
Pobíjačka - ("naildriving" axe) - is special axe used for nailing and hammering wooden pegs. It has also cuts or eye for pulling nails.

Splitting axe - ***Lícovka*** - is used for cutting edges of a beam, to create a plane on a sides of it.

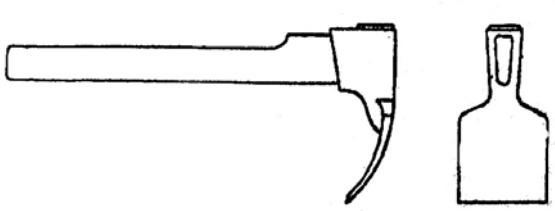
Carpentry axes - specialized



Chisel axe – ***Dlátovka*** - is used for cutting holes or shaping edges, carving etc.

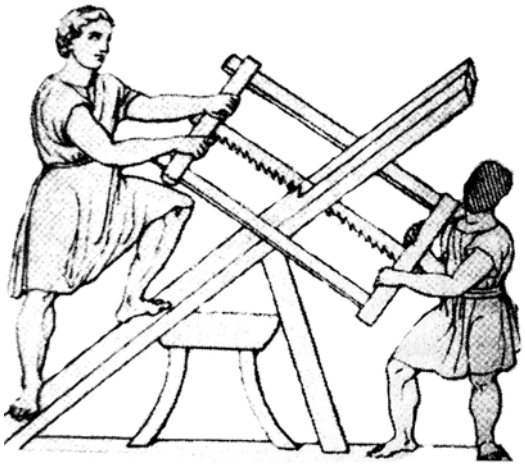


Cross axe – ***Krížovka*** - is also used for cutting holes or shaping edges, carving etc. Some examples of work with cross axe.

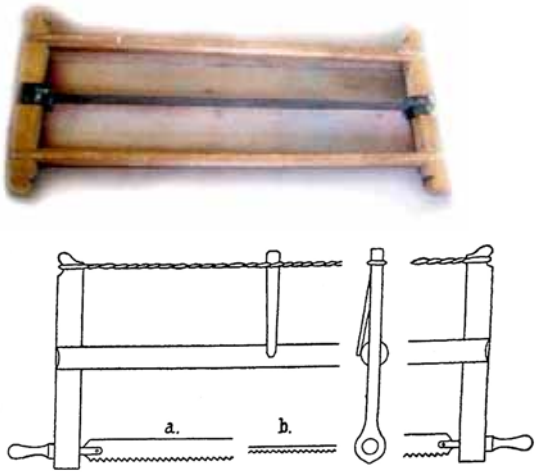


Adze – ***Teslica*** - is an axe with perpendicular blade, used for cutting holes. Specialized curved axes were used in ship building and barrel making.

Saw



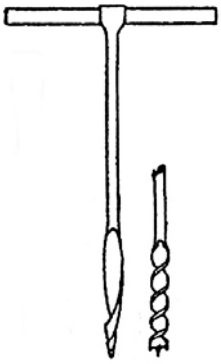
Two-man frame saw, Roman Empire



Two-man frame saw – ***Dvojmužná rámová píla*** – was used a centuries ago as proofs stone relief from time of Roman Empire. This saw was used to divide beams or shorten them.

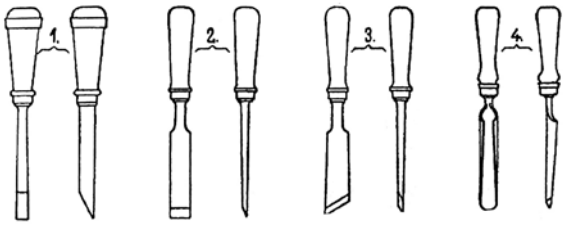
Two-man saw – ***Dvojmužná píla***

Drill



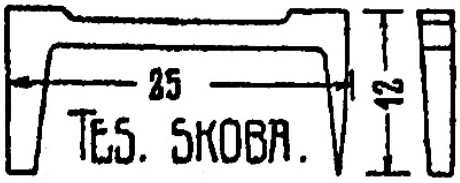
Hand drills, drilling of wood – Albrecht Durer

Chisels



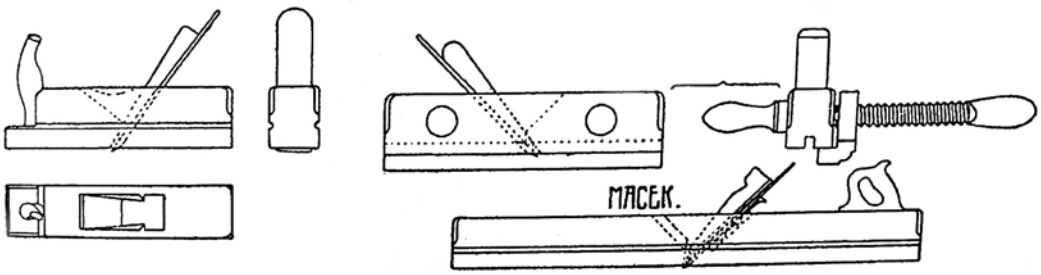
Two-handed knives

Two-handed knives – *obojručný nôž* – is used for primary work on a wooden log, removing bark and shaping prepared beams.
Iron fixing

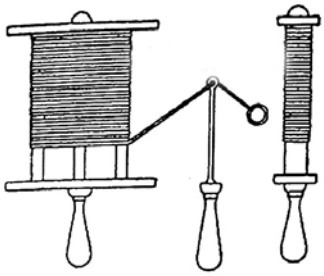


Fixing – skoba – is used for predecesing fixing of proper position of two wooden parts which then were connected by some carpentry joinery.

Plane



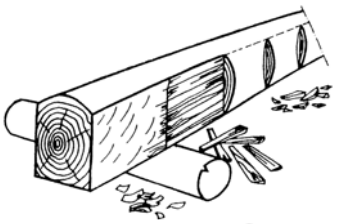
Measurement tools



Kolovrátok – was used for measuring distances, helping drawing lines.

Work techniques

Shape of a future beam is draw at a log by painted piece of rope. Rectangular shape is mesured at the both ends of a log. Then painted rope is fixed at the both ends and springed against a log as bow. This draws a line along log – mark of a future edge.
Two kinds of work with log:



1. Log lies at the groung or low supports. Carpenter cuts V shapes at regular distance circa 40-70 cm, then cuts away unnecessary material to create a rectangular beam. Hathes of axes are long. Carpenter goes back at this type of work – called LOW WORK.

2. If the log is supported in the height of 60 cm or more, carpenter goes forward then cutting the edges of a log. For rught work symmetrical axes are used, for fine work asymmetrical axes are used, all axes had short hatches. This technique is called HIGH WORK.

Cutting edges by means of V shaped regularly made cuts is the only one possibility of cut away unnecessary material. Is cutt-away parts would be too long, axe would be after some distance squeezed between wood mass.

Cutting beams for building, Kysuce region, around 1950.

Shingles

Shingles for roof covering were made in all regions of nothern Slovakia. Almost the same types of tools were used, although they have regional local names. Here mentioned names are typical for Orava and Kysuce region (western part of north Slovakia).

Shingles are wooden boards 50-60 cm long, 7-15 cm wide and 1,5 thick. They have a blade on one side and side along cut on the other side, to be easily connected side by side to one another. Shigles could be lied down in one or two layers. Blade side is oriented to a prevailing winds side, also the first row at top of the roof is put that way that groin end of shingles is positioned to south and plane of shingles to the north.

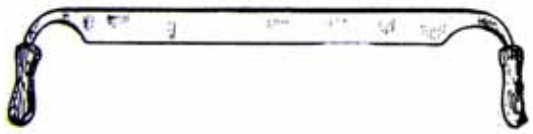
Older way of making much more durable shingles is to cut then from a log in a groin direction. Cutted shingles can be safe roof cover for a 30 or 40 years. New way is to saw them, this is cheaper, but shingles are less durable to weather conditions.

Tools

Topor – normal axe

Pantok – cutting axe

Fugač – two-sided knife



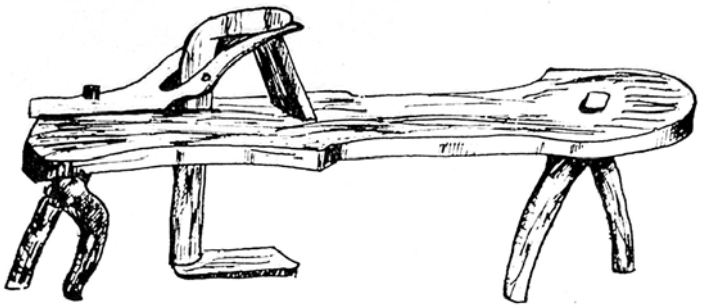
Povez – two-handed knife

Shingles could be made during stay in the woods in a working season. Movable equipment for shingle making could be fixed to the tree trunk. piece of wood was fixed between two boards and shaped by two handed knife.

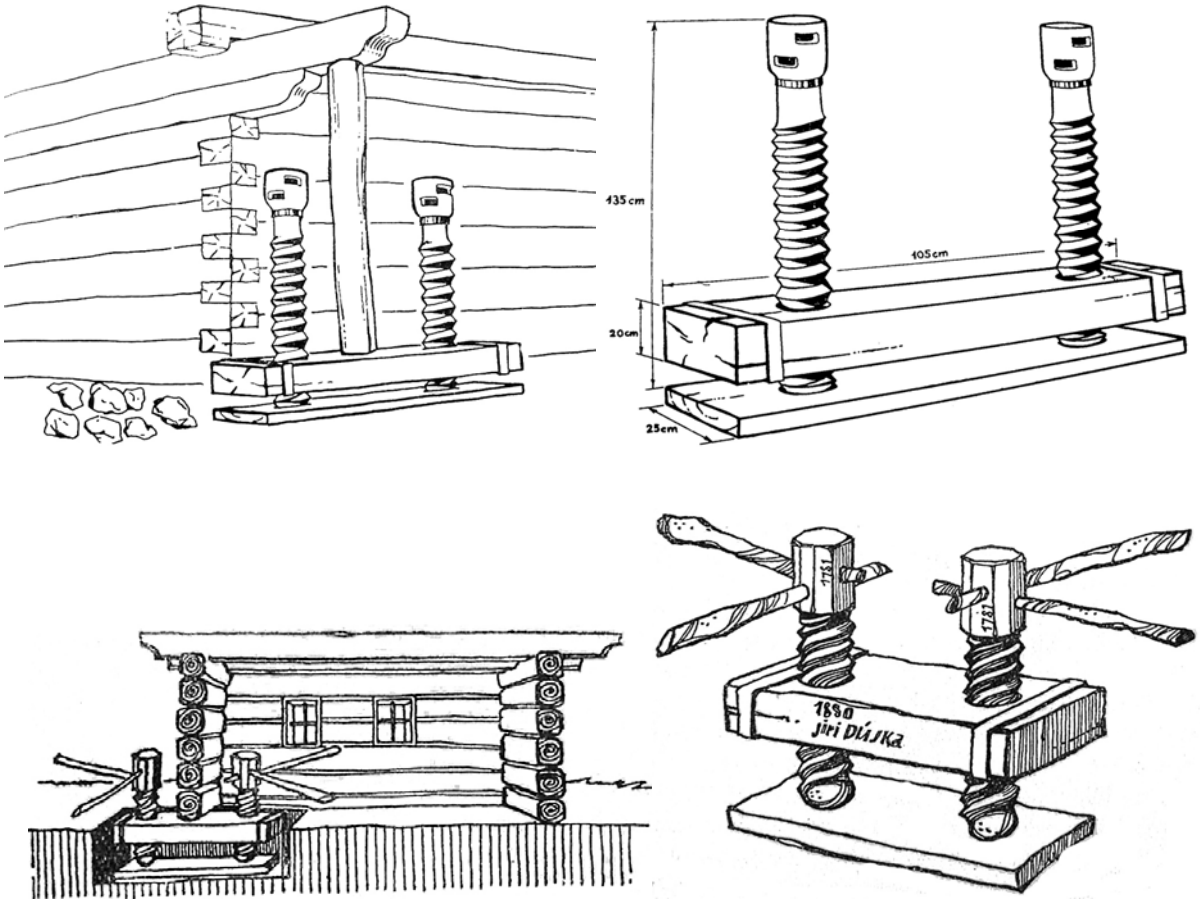
This is a similar "table" for fixing and shaping wooden shingles, used at home craftsmanship.

Mainly bottom beams (zátvorové trámy) of wooden logs were sooner heavily damaged by weather conditions, humidity which caused apperance of various fungi. This beams loose the capability of support and load carrying, thus endangering whole wooden structure. They were often the only one beams replaced during buiding logevity.

Variously shaped massive wooden lifts were used to lift the whole log structure, so bottom beams could be replaced. This one is from Kysuce region.



Tools for replacement of log parts



Wooden lift from Moravia nearby Slovak borders.

Literature:

- Wikipedia®
- Ars Tignaria, společnost tesařského mistra Petra Růžičky
- ŠTAJNOCHR, Vítězslav. Tesařské sekyry, nástroje tesařské technologie I. In: Muzejní a vlastivědná práce, 1979, č. 3, s. 148 – 168.
- Historický slovník slovenského jazyka, Veda Bratislava, I. diel 1991, II. diel 1992, III. diel 1994, IV. diel 1995, V.diel 2000
- Krátky slovník slovenského jazyka, Veda, vydavateľstvo SAV Bratislava, 1989 -
- Špiesz, Anton: Remeslo na Slovensku v období existencie cechov, Bratislava 1972
- Špiez, Anton: Remeslá, cechy a manufaktúry na Slovensku, Osveta Bratislava 1983

Contribution to the Matter of Wooden Church Lighting

Beata Polomová
Faculty of Architecture, Slovak University of Technology

This matter deals with artificial lighting of churches visited during professional excursion in the Czech and Slovak Republics and shows instructions for acceptable solutions.

The culture-historical value of wooden churches.

Wooden churches of the under-Carpathian region present a significant fragment of the complete sacral architecture in this area. Up to the present time, couple of tens of them survived, while many of them come from the beginning of the 16th century. Obviously, their culture-historical value is great and irreplaceable. On one hand they represent buildings for various Christian creeds and they are cultural evidence of lively and simple religious life, on the other hand they represent art based on regional materialistic basis, which is peculiar.
Wooden churches have great authentic value that relates to structural, as well as artistic and symbolic aspects of architecture. This statement is even more valid, since we find them in their original condition, practically without large interference. Besides new liturgical furnish originating in catholic churches in the 60s of the 20th century (altar, ambo, sedes-chairs), we often find only minor reconstructing interferences, as for example: wooden replacements, new plating, small static reconstructions and likewise. Considerable part is created by new added technical equipment, which increases the safety of the object against fire and robbery, and of course, the standard for congregation. Electrical lightening also belongs there, mostly installed after the second half of the 20th century. It is necessary to remind that architectural and symbolic aspects of church depend on liturgy, thus from creed that the object belongs to. (For example its platform, shape, frame, interior layout. Today we can find also objects that gradually used to belong to two creeds in the past, as its interior layout reflects. (For example: the catholic – evangelic – catholic, orthodox – Greco–catholic, Greco–catholic – catholic).

Luminous atmosphere of interior.

If we notice important aspects of the wooden churches originality, it is also the luminous atmosphere of interior, which is bound to certain religion and its sacra mentality. The amount of light was not only subject to movement era and structure alternative. In general we can say that Eastern rituals preferred darker, subdued mystical atmosphere with small windows. Lighter, even light space is characteristic for catholic and especially evangelic churches. Besides interior itself, we need to notice other phenomenon, which comes to church during worship – the candlelight. Candles are placed on table, altar, wall candlestick, lanterns and chandeliers. Since this item is strongly bound to creed and its ceremonies, the subject of our intention will be its narrowing to utilitarian function, when candle chandeliers had the purpose of the overall lighting.

Interior electrical lighting.

We can distinguish several purposes of electrical lighting, which modernised the object.

a) Primary utilitarian purpose: to enable each believer to see better and to have the possibility to read. All the rooms were lighted – under tower in exterior, body and shrine – according to creed requirements and technical and financial capacities of the investor. Here is an interesting example of Albrechtice church, the Czech Republic, which stayed without electrical lighting until today, which is positive from the point of view of monument preservation.
b) Presentation of art-historical values: in our country, this intention for new electrical installation is being administered only nowadays, with connection to increasing tourism. In the past, paintings and icons were lighted by candles, what had and has also another – symbolic aspect.

Note: exterior illuminations are newer and are connected with object presentation as a monument and local dominant.

Lighting systems – present condition.

According to findings in the majority of monitored objects in Slovakia and the Czech Republic, electrical installations are damaging the authenticity of the object (cable circuit, lighting objects and manipulating items):

- These added technical equipment on the surface of wooden walls and ceilings aesthetically disturb the interior and have a contrast effect on structure. Picture No. 1.
- Temporary solutions and materials are also connected with times of origin and narrow means in small villages (before the year 1989, the offer of electrical materials was limited and political regime was limiting objects maintenance; the most of works were self-helps. Picture No. 2.
- While implementing the electrical lighting, some candlesticks made of brass and wood were sometimes mended (probably financial reasons), what was reducing the monumental value and at the same time seemed not aesthetical but temporary. Picture No. 3.
- There is an evidence of influence of brick churches present at lighting:

a) Frequent use of chandeliers; such a chandelier is considered church icon, although it appears as a contrast in wooden object interior. Picture No. 4. The exception can be bigger baroque or newer rooms.
b) Lighting frame of altar paintings is visible as a trend of the 50s of the 20th century, what shows the effort to claim the light as a symbol. Picture No. 5.

- In some cases wooden parish churches were replaced due to their small capacity with new buildings in other locations of the mansion, and it rarely served to its religious purpose, for example religious feast or selected family events. We can find old installation in these objects, that was not modernised and today's renewal requires its entire exchange.
- In last years, specifically renewed objects put emphasis on mutually not disturbing interconnection of "technical cultural area": colours are harmonised and circuit tracing, placement and measures of lighting. At the same time, the lighting solves the presentation of artistic values, not only lighting itself. The selection of lighting models–settings, are more personal. Older installations are quite simple, according to rooms, not according to purpose. Conjunction and distribution terminals are suitably covered with wooden material, or present-day, more modern materials for installation are used. Picture No. 6.

New solutions – ideas for lighting reconstruction:

a) besides useful function we must consider the significance of lighting and light rooms:

- In accordance with the meaning of liturgy, it means to distinguish religious creed when proposing, and take into consideration its symbolic understanding of light. From this point of view, the Easter ritual churches are demanding, churches that have iconostas, and have the damped light atmosphere.
- In accordance with art-historical values: these values influence the whole setting solution. For example symbolic and artistic icons of object should not appear as lighting holders. Lighting can present only unique values, through more setting and likewise.
- In accordance with the rules of monument preservation and methods of specific object renewal.

b) Profession cooperation: with these original objects, we need to use uncommon approach and methods, that is why the cooperation of specialists is inevitable (lighting technician, monument methodist, fine art scholar, architect). Maintenance of technical norms may guide to standard, common solutions for brick buildings, however, we must apply the experience of specialists to individual solution for each construction.
c) To preserve authentic wooden door or brass candle chandeliers and wall lightings on their original place, even without functioning properly, and complete a new setting accordingly.
d) Lighting setting. It should meet several criteria, as for example: it is necessary to apply contemporary technical solution and provide the selection of layouts / regimes in advance, and suggest the way of operating. From the methodical point of view, the setting is a new technical item, which does not require interior solution or contrast. Essentially, it should not be perceived at the first sight. So we should avoid selecting the shortest connection while cable tracing, however the least visible, which colours will be adjusted to the surface of construction. Nowadays cable materials enable to solve its circuit aesthetically. In terms of measures, it is recommended to choose rather smaller objects of lightings, or select individual portable lightings. It is important to select sources with warm light colour, which resemble the authentic atmosphere. Protection from dazzling must be secured. It is also important to consider the light spectrum from source, and avoid damaging historical paintings by its UV radiation.
e) Expenses influence the final outcome. When proposing the project, we need to consider the requirement for low cost maintenance (even if the price of input investment is higher). That is why the proposal for individual projects of electrical installation and lighting are advisable, and with low budget prefer to choose building in stages.
f) It is recommended to verify the quality of outcome with in situ test, where some parameters can be checked, especially brightness, lighting traces, lighting colours and illumination.
g) At the end of mounting works, the documentation of actual execution must be carried out.

1. Improper tracing.
2. Emergency use of indoor and industrial lightings.
3. Improper chandelier arrangement.

4. Improper lighting decoration – dazzling may occur.
5. Chandelier appeals to be strange in wooden church.
6. Proper covering of electrical equipment.

7. Proper lighting adjustment.

8. The detail of chandelier with coloured adjustment processed earlier.

9. Proper wall illumination, with the help of separate lighting or lanterns.

Electrical Solutions in Wooden Religious Buildings

Jaroslav Španko
Faculty of Electrotechnics and Informatic Technologies, Slovak University of Technology

Contribution deals with exterior and interior electrical equipment of selected wooden religious buildings, including recommendations for electrical installation renewal. Inspections were done in twelve churches located within the Czech and Slovak Republics.

1. Electrical equipment integration – contemporary condition and impulse for renewal

From the functional point of view electrical equipment in historical wooden churches plays a second part. They were installed as settings from approximately the second half of the 20th century. Some are older, especially in areas where they used to replace candles. From the point of view of appearance and location, they appear as accessory to wooden construction, what apparently disturbs the overall church architecture. The aim of future reconstructions is to integrate it aesthetically and keep the authentic interior of the building.
From the point of view of used electrical equipment, the most of monitored equipment was created from easily available materials and items, designed for indoor or industrial environment (Fig. 01, Fig. 02a, Fig. 02b, Fig. 03).
The feature of trace executing is mostly the effectiveness, without aesthetical values, without any counselling with monument preservation institution or architect. The amount of electrical equipment in wooden churches may nowadays increase to the extent, when it is inevitable to look at aesthetics in a conceptual solution. Cooperation of specialists is required, for example in the field of weak current – loudspeaker posts and emergency lightings suggest having similar external appearance, since the place of their location is convenient for both equipments. This also applies to disturbance alarm system equipment, electrical security system, and counter-placed lightings, so that they do not appear as "the bunch of accidentally gathered devices". Production of cable distribution from the point of view of space minimisation (grouping, placing into gutter with adequate surface lay-out, minimisation of conduit amount), is far more topic for future than reality. Example of aesthetics is a renewal of wooden church in Ostrava-Hrabovo, even though lightings would require better approach from technician regarding a dazzle. (Fig. 05).

Exterior: usage of high poles as an arrester within the area of wooden churches may save expenses for building the arrester, what can have aesthetic impact for wooden churches. At the same time, it can protect the area around church against atmospheric electricity as well. We can omit nearby trees, of which the height presents bigger danger of thunderbolt. We can also use poles nearby wooden churches for placing exterior lightings of spreading area. A new shouldering of poles needs to be discussed with an architect.

1. 2a.

2b. 3.

4. 5.

2. Heavy-current solutions, principles and actual installation of electrical equipment in wooden churches.

Administrator of wooden church is responsible for safety condition of electrical equipment, as well as for keeping documentation regarding installed technical device. This includes the protocol about mutual operation of construction, its materials, surroundings and equipment. Except for documentation about actual construction execution, the mentioned protocol must also be listed in basis of Report of specialised inspections and tests. The protocol about mutual operation must be elaborated before the proposal for renewal is made.

Low voltage connectors

Wooden church as a separate building usually has its own number, and thus also separate low voltage connector. Exterior (outer) connectors are of lower expense and technically simpler, however, they disturb outer appearance aesthetically. More convenient are low voltage connecters in cable under ground. Dilemma is the demand for shouldering of the main terminal box (usually metal or plastic), that must be accessible and visibly placed, and at the same time it should not be disturbing the exterior of the object. When preparing electrical solutions, it is recommended to consider its colour surface layout, which is adjusted to wooden church appearance.

Contemporary regulations require placing of electrometer box in the publicly accessible place. Due to older electrical installations, we can often find electrometer boxes in sacristy, in the main distribution board. Shouldering of electrometer box in fence should be projected with architect responsible for fencing of the area.

Internal heavy-current distributions

We need more legislative and technical conditions to execute electrical installation in wooden churches. Before any works relating to heavy-current electrical equipment, we are required to be familiar with material selection according to flammability degree. According to STN 0823 we can consider inflammable materials for example: cement, clay, sandstone, stone, glass, steel and other.

We can speak about four degrees of danger when talking about flammable materials:

- B – not easily flammable, for example mineral fibre boards,
- C1 – heavy flammable, for example oak, beech,
- C2 – medium flammable, for example spruce, fir, pine-tree,

- C3 – easily flammable, for example poplar wood.

The solution of electrical installation must fulfil the temperature condition – the material temperature (all degrees of flammability that are in connection with electrical device) can reach maximum 120ºC. This temperature of flammable material or similarly flammable ground and object cannot be exceeded, not even with its breakdown, which counts whipstall, cut-off, current lead release, unattended service, as an impact of improper mounting, or when electrical object function failure. The electrical object for flammable ground must have a propriety certificate from a producer or an accredited test-studio, with the range of materials with specified adequate degree of flammability. (Atypical chandeliers and lightings must also have an approval document – at least of technical inspection).

Distribution boards must be easily accessible also in case of additional overlapping by garnished flammable materials. In case of overlapping, their position must be absolutely visible. On uninhabited attics, it is possible to put leads into inflammable ground and into materials only with accessories in padded system with protection at least IP42. In flammable ceilings and rooms with possible danger of fire, tubes must be solid – joined by bonding (armoured insulation distributions), or must have threaded coupling (metal armoured distribution). More detailed data are listed in STN 37 5245.

When distribution is led through anti-flammable walls, its anti-flammable resistance cannot be reduced. Transitions of electrical distribution through crosswise flammable materials, both vertically and horizontally, must be made of the same way as when shouldering into flammable materials. Power conductors either of or for flammable materials must be secured against whipstall and cut-off according to STN 33 2000-4-xxx, STN 33 2000-5-xxx. It is highly recommended to secure with safety cut-outs.

Power conductors, cables, wiring, direct burial material unless not shouldered with clamps, can be placed either on or into flammable materials of all the flammability degrees, if they are not flammable or at least resistant to fire spreading.

Artificial interior lighting of wooden churches

Nowadays it is very common to use valves to light, especially with huge constructions and larger territories. Its advantage is good affectivity in electrical energy exchange towards light, as well as the selection of features from correct colour perspective. (Example of proper area lit with valves is for example Fig. 06).

Concerning safety lighting, we use bulb due to its promptness. From investment side, the bulb lightings are less expensive; however, their energetic demand factor is much higher. The propriety of its usage is mainly defined by the length of lightening, as well as by the price of electrical energy, and thus expenses for burden, or economic return.

Mounting of lightings requires respect of not only safety fire protection of terminal board, but also respect of allowed distance from flammable materials (for example textile materials), which may occur within lighting direction.

Obligation to establish emergency lighting results from legislation. The advantage is that there are candles lit during the liturgy, what helps to find the way in case of lighting failure. This occurs especially in smaller churches.

(Characteristic feature is an artificial lighting with the use of candles only in wooden church Albrechtice. It is obvious that while burning candles, the electrical fire protection system is off.)

6.

Artificial exterior lighting of wooden churches

Mainly exits and gathering places should be lightened for safety reasons. Paths to wooden church should belong to public municipality lighting. Experiments with slim wooden poles construction have not been successful yet.

Socket installation

Sockets for wood-working machines cannot be overlooked. They are important with outer reconstruction of wooden church. They should be accessible at least through windows.

Electric drive bells

The box of automatic time setting for ringing is recommended to be readily accessible. If a remote communication is installed relating to for example alarm protection system, it is wise to consider a ringing control. (For example the death of a community member).

Over-voltage

Over-voltage in low voltage net can be cause by the transfer of partial flash current, by inductance from line arrester, or by various temporary changes within nets. Since wooden churches nowadays are equipped with alarm systems, electronic fire protection systems, sounding and so on, (for example electronic ballast of lighting), to decrease a destruction probability, Over-voltage protection is reasonable. Over-voltage protection is missing in older installations.

Equipotent line-up / levelling

Equipotent bar should be placed close to the main distribution board. This bar is essential for contemporary electrical equipment.

Distribution board

Fire protection precautions exclude shouldering of distribution boards into wooden wardrobes, or its garnishing by flammable material. Moreover, distribution boards must be distinctively marked, easily identifiable, with the notice, if the main power cut-off is placed. Documentation about current condition of installation should be placed in the inner part of the door.

7. 8.

Tempering

Very important field for installation and operation of electrical thermal appliances are legislative regulations. A regular inspection of distances among flammable materials from thermal appliances is essential. Thermo-insulating materials and not metal materials (as in case in Fig. 09) should be used for protection against elevated temperature. High-temperature infra heaters are not recommended for use in wooden churches, more suitable is low-heat tempering parts of floors, mainly face-centred, in the place of celebrant. Obviously, continuous tempering in renewed wooden churches is uneconomical. This could cause the damage of wood in historical wooden churches (probably the increased craze).

Ventilation

Current systems of operation enable the inspection of physical parameters of wooden churches (temperature, dampness,) and consequently, also automatic operation of ventilation. We can reach the optimum climate (monument preservation) for wooden church construction, visual arts and furniture as well.

Arresters, grounding

Legislation requires protection against atmospheric electricity and specific norms. Arresters device on wooden churches is usually common – there are two conductors from the cross and on roof (usually saddle roof), there is a

finger joint with accumulating rods. Attachment of metal structure of bells is important. More bells have usually separate grounding. To prolong the lifetime of arrester, a copper material is used, however, this can also be of a worse impact – in cases where the attachment is made with steel (zinc-coated) plumbing products, the use of bimetallic switch-over is necessary.

This switchover, however, is destroyed after lightning stroke. Apparently, copper-conducting material is reasonable, if plumbing products are made of copper as well. The propriety of aluminium high-conductivity cables is arguable due to lower temperature of aluminium melting and also due to destructive chemical reaction with calciferous building materials. The distance between collecting and conducting conduits from flammable material is important. Example of dangerous installation is in the Fig. 04, Fig 09, Fig 10.

9. 10.

Ground resistance in given soil conditions should be the lowest for a certain period of time; this is why we have to pay attention to grounding and proper anti-corrosive joints protection.

In specific cases, the protection with active arrester can more affective. Before its implementation, access and/or operation manner of function for electronic part of collecting rod should be solved.

In cases of huge damage caused by lightning stroke, the insurance company usually consults the arrester specialist.

Disturbance alarm system

Insurance companies require the minimal range of mechanical and electronic protection. The advantage of disturbance alarm system is its ability to detect also different critical conditions, since digital systems allow the selecting of either one reason or combination of reasons. (We can announce for example allowed entrance to the church, the failure in automatic operation of bells, and so on). After disturbance registration it is recommended to send not only acoustic note in church but also send it to telecommunication device (for example administrator's mobile phone, mayor, police, etc.). If there is a burglary at night, it is quite useful when bulb searchlights are switched to the regime of interrupted lighting – efficient light siren. With remote controlling, this regime can be used the other way round, for example for switching the church illumination on and off during days of tourism activities. (Very good equipment is in renewed wooden church Ostrava-Hrabova).

Electric fire-protection alarm

Insurance companies also require this. To enable the fastest fire-protection interference, the addressing of notice must be managed to specific person and institution (for example to the mobile phone). A regular, compulsory check-up of fire extinguishers is important. (In the majority of wooden churches extinguishers are missing, electric fire-protection is only in few of them).

Sound distribution

The important is distinctiveness of human voice and musical instruments. An acoustic specialist should judge quality check, reflectance and absorption of certain sound wave. If a person with insufficient experience does sounding, installations are not satisfactory. The sound distribution of outer space is difficult and demanding as well.

Display

Attention must be paid to contrast – due to good visibility also in good weather. Matrix displays with the option to quote the whole lines are more convenient, though of bigger measures.

Digital cable distribution

Except for a microphone (also a portable version), the function of firmly installed constructions is more reliable when using digital cable interconnection. High-frequency transmission is suitable also in cases where it is impossible to place the distribution, for example due to monument preservation reasons.

Liturgy of the Eastern Byzantine Rite

Ladislav Bobcak
Faculty of Fine Arts, University of Technology, Košice

Christian liturgy has gradually developed from the Apostolic traditions in the individual Churches. Two main groups – the Eastern and the Western group - have evolved in this way.

The Eastern liturgy is divided into two main groups: the Antiochian and the Alexandrian group. The Antiochian group is subdivided into West-Syrian and East-Syrian type. The West-Syrian type is classified according to its rite as the Syro-Antiochian, the Maronite, the Byzantine and Armenian rite. The Byzantine rite has been used by the believers of the Orthodox Church, of the Greek-Catholic Church and by the Melchites.

As worshipping of images is characteristic of the Byzantine rite, there is a wall of icons – an iconostasis – situated in a temple, separating the presbytery from the main nave. Hymns are in abundance in the Byzantine rite as well.

The policies of the Kingdom of Hungary caused a gradual adaptation of the Orthodox Ruthenians to the state official Roman Catholic Church. That is why the Uniate Church or the East-Christian Church subordinated to Pope had evolved during the years of 1596 -1646. In 1772 the Uniates were renamed to the Greek-Catholics.

The main parts of the temple

The ancient Christian temples consisted of tree parts:

- an anteroom (also: pronaos, vestibulum, pritvor)
- a nave (also: naos)
- an altar (also: agion, presbyterium)

According to the cardinal points, a temple was situated with its anteroom to the west and with its altar to the east.

An anteroom (pronaos) was divided into inner and outer part.

The outer pronaos was situated in front of the temple, as an uncovered place (atrium) surrounded by a portico, which is a covered corridor with a roof supported by pillars. In the middle of the atrium a barrel with water, called "emvatis", was placed. By washing their hands in it, believers wanted to refer to the inner purity of their spirit during praying. The outer pronaos served for sinners and beggars.

The inner pronaos was called the Paradise, as on its inner wall Adam and Eve were depicted. There was a barrel for Christening, called "piscina", as well. This place served for Catechumen, penitents and listeners. From the inner pronaos it was possible to use tree doors to enter the nave of the temple.

The nave of the temple was divided by the main aisle into the right (or southern) and the left (or northern) part. The right part was for men and the left one for women. Between the nave and the altar of the temple an iconostasis was situated. In front of the iconostasis there was an elevated platform with two or three steps and a dais ("ambon").

Iconostasis is a wooden (or it can be stony or metal) wall decorated with icons. The term consists of the two Greek words: "eikon" – an image, and "stasis"- a building. Iconostasis has been regarded as a symbolic border between the earthly and heavenly life. It has evolved from a low wall in the Byzantine temples, which was replaced by a high construction extending from the floor up to the ceiling of the temple in the 14th century.

Iconostasis has three doors. The central one is so-called Tzar Door or Holy Door, and serves for the liturgically dressed, ordained priests. The scenes of the Annunciation and four Evangelists are depicted on the door. An icon with the image of Christ is on the right, and an icon representing a patron or festival to which the church is dedicated is situated further along on the right. The Mother of God's icon is on the left side, as well as an icon of St. Nicholas. The side doors are so-called Deacon Doors or Angel Doors, as for the symbolic deacons' crossing through them as angels.

Above this so-called first row, there is the second iconostasis row (the row of festivals) with smaller icons situated. An icon representing the Last Supper, or an icon of Mandylion can be found in the middle, above the Royal Door. Six icons representing twelve festivals of the religious year are situated on both the right and left sides.

The line of Deesis is situated in the third, apostle row. The icon of Christ High Priest on the throne can be found in the middle of it, and pictures of the twelve apostles are on the sides. In the older type of Deesis, there was a Holy

Virgin on the right of Christ and Saint John the Baptist on the left. An even number of Archangels, Evangelists and Church Fathers were depicted on both sides.
Pictures of the Old Testament prophets are situated in the fourth iconostasis row.
The whole iconostasis is usually topped by the Calvary with the figures of the crucified Christ, Holy Virgin and Saint John the Evangelist.
The number of iconostasis rows often depended on the height of the church, though its composition was not stable even after the 17th century.

The altar is the holiest part of the church, as the most significant holy ceremonies are performed in there. The most important part is the Holy Throne ("prestol"), which is situated in the middle of the altar. It is used for offering a non-bloody sacrifice according to the New Testament. It is wooden, of the square shape with four column legs and with dimensions 1m x 1m x 1m. It has to be covered with a white cover - "katasarka". The relics of martyrs used to be placed under the "prestol". The flax linen ("iliton") is placed over the "prestol". It is used for wrapping the silk cloth ("antimins") with the image of the entombment of Christ on it. There is a hand cross and a procession cross situated on the "prestol", as well as the Holy-stand, called: "kivotos", "artoforos", "ciborium" or a canopy. It can appear as a little temple or a cave, although a small case, in which the holiest Eucharist is inserted, is used for this purpose at present.
The Holy Gospel and six burning candles are usually placed on the "prestol". If a Bishop conducts the divine service, the seventh candle is added. To the east of the Holy Throne is the upper "prestol" situated, where a bishop and priests are seated during the Holy Liturgy. To the left of the Holy Throne is a "zertevnik", where the brought presents are placed, and also bread and wine for the non-bloody sacrifice is prepared.
To the left of the Holy Throne is a "diakonnik" situated, which serves for placing the ecclesiastical robes and religious books aside.

The wooden churches in Slovakia

The wooden churches in Slovakia originate from the 15th-19th century.
The Roman Catholic are the oldest ones. They have developed from the Gothic style, they have a lengthwise ground plan and a bell-tower (Hervartov, Tvrdosin, Trnove).
The Evangelical churches are younger. They have evolved from the Renaissance style, their ground plane is central with the crossed disposition. They do not have the bell tower, as a belfry stands separately (the Central Slovakia).
The youngest and the most numerous are the Orthodox and the Greek-Catholic churches, spreading from the river Poprad (in Slovakia) till Ukraine. Their ground plan is a compound of the lengthwise and the central system.
There are known two basic types of the wooden churches of the Eastern liturgy: the Hutsul and Bojkian types.
The churches of the Hutsul type are centrally-planned, their ground plan is Greek cross shaped and is created from five log-buildings. This type of wooden churches does not occur in Slovakia.
The Bojkian type has a lengthwise ground plan,which consists of three log-rooms with three spires above them. Its lengthwise axis is situated in the east-west direction. The nave of the church is the largest log-room, above which the highest spire is situated. The archetype of the original three-part design of a wooden church originated on the territory of Ukraine in the era of the Kievan Rus.
The Lemkian type of a church has evolved from the Bojkian type. Its spires gradually rise westwards.
The tripartite character of the space is the common feature of the Bojkian and Lemkian wooden churches. Three log-rooms are situated in the west-east direction. The first log-room is called "babinec", which functions as an entry to the church and for the women congregation. The second log-room is the nave of the church, serving for the men congregation. The third log-room is the sanctuary of the church.
The basic material for building of the wooden churches was the coniferous wood: the red spruce, later on the spruce and the fir. The hard wood, like the oak or the beech was used for the construction of the bell towers.
The foundation of the church is composed of the broken rocks, laid together either without any connective material, or were joined with the cement mortar.
The constructing system of the church is a log-building. The post constructions were used for building the towers and belfries. The shape of the log-building constructions is in their ground plan rectangular, or polygonal. The timbers have been trimmed into prisms. Nails were not originally used because of the spiritual reasons, and that is why the dovetail joints and oak-wood wedges were used in the corners instead.

The wooden construction of the log-building walls was covered with vertical wooden planking in the interior and the exterior as well. Sometimes the walls of the church were in the so-called "fur coat", as the horizontal beams were plastered with a coat of plaster and over-painted with the lime coating.

The roofs of the churches differed: the mostly used was the saddle roof or the broach roof topped by onion-shaped spires, but the conical roof was used as well. All the roofs have been covered with shingles.

Bibliography

- The Orthodox Liturgy I.: Dr. Lazar Mirkovic, Pravoslavna bohoslovecka Fakulta 1994, Presov.
- Liturgy II.: Mgr. Vojtech Bohac, Spolok biskupa P.P.Gojdica, 1994 Presov.
- The wooden churches of the vicinity of Bardejov: Mgr. Jana Bozova; PhDr.Frantisek Gutek Sajancy, 1997 Bardejov.
- Monuments and museums, Wooden Tserkvas in the East Slovakia: Miroslav Sopoliga, 1999 Bratislava.

SLOVAK REPUBLIC

Faculty of Architecture, Slovak University of Technology

CURRICULUM VITAE

Eva Kráľová

College lecturer at the Faculty of Architecture Slovak University of Technology in Bratislava. She focuses her attention on the questions of architectural heritage research in the Slovakia, their publicity and presentation, in the long term. She is engaging in the field of practical renewal of architectural monuments and their optimal utilisation in the larger international context, employing her rich foreign contacts and experiences, at the same time. She is former president of ECOVAST Slovakia, member of international committee ECOVAST, Slovak committee ICOMOS, expert's board of Foundation R. Del Bianco in Florence. Her portfolio include Unique construction of first hung iron roof, The historic roof covering of Slovakia, The value analysis of unprotected rural cities.

Zuzana Babjaková

She is specialized in Architecture and Monument Preservation. At the time teaches at University of Zilina – history of architecture and civil engineering, technical design, architectural project and interior design as fellowship. In the same time she is PhD student of Slovak University of Technology, Faculty of Architecture in Bratislava. From 1999 up to date is in external cooperation with advertisement agencies - advertisement graphic. From 2001 till 2005 she worked as specialist in the area of monument preservation in Slovak Board of Monument Preservation, Regional Board Žilina. As a partner of architecture design studio she designed several project of renewal and reuse of historic architecture.

Ivana Lisická

She is specialized in Architecture and Monument Preservation. At the time, she is PhD student of Slovak University of Technology, Faculty of Architecture in Bratislava. She took part in the research activities and projects oriented to the historic architecture and materials. As a young researcher, she improved her skills by participation at several workshops and conferences. From 2004 up to date works as external redactor for Architecture & Interiors Magazine and for Design & manufacturing plans of furniture in a private firm in Bratislava.

Jaroslav Španko

Education:
1965 – 1969 Secondary Technical School, Bratislava
1969 – 1974 University of Engineering, Electro Technical Faculty; Production, distribution and Utilization of Electric power
1978 – 1983 External Postgraduate, major: artificial lighting
Work Experience:
1974 – 1989 designer, Project-engineering organization, Bratislava
1989 – 1991 chief designer, Kovoprojekt Bratislava
1991 – 1994 enterprise activities within Kovoprojekt, in the field of lighting engineering
1994 – 1997 technical expertise and acquisition activity in Siemens Ltd., Bratislava
1997 – Trade in preparation and electrical solutions of constructions
Expert certificates and activities:

- *Authorised civil engineer; Technical, technological and Energetic equipment of constructions, 3170*A*5-3,*
- *Safety inspectorate in Bratislava, certificate no.: 149 IBA 1998 EZ E A E2,*
- *Cooperation with universities,*
- *Active participation in special conferences,*
- *A member of technical standardisation committee for lighting,*
- *Cooperation with SAV – Slovak Academy of Sciences, the Institute of Civil Engineering and Architecture, diurnal lighting*
- *Development of supervisory system for artificial lighting, industrial prevention and its continual export abroad,*
- *Atypical lightings.*

References (in sequence from 2006 to 1974):
Sacral buildings:

- *St. Juraj's Church, Kostolany pod Tribecom, documents for building licence,*
- *St. Demeter's Church, Porac, documents for building licence,*
- *St. Katarina's Chapel, Bratislava, artificial lighting, lighting delivery,*
- *St. Margita's Chapel, Bratislava, Lamac, preparation for delivery of artificial lighting,*
- *Holy Spirit Church, Zehra, preparation, trial demonstration and approval of artificial lighting,*
- *Convential Church of Ascension of the Virgin Mary, Zdar nad Sazavou, documentation, delivery of lightings for lighting reconstruction is being realised at the time,*
- *St. Benadik Opiates Church, Hronsky Benadik, documents for building licence,*
- *Consultancy and actual verification of projects for artificial lighting of various churches, for example St. Stefan's Church, Bratislava*

Civil buildings:

- *Slovak Technical University, Faculty of Architecture, preparation and realization of artificial lighting reconstruction of art rooms,*
- *New system of artificial lighting control, including realization in IKEA, Bratislava,*
- *Artificial lighting reconstruction of Government Authority, big conference room, press centre,*
- *Institute of Metrology and Standardization, Bratislava, implementation projects.*

Exterior lighting:

- *Bratislava public lighting preparation and realization take-off,*
- *Lighting of M.R. Stefanik´s tumulus, (nowadays trimmed due t vandalism),*
- *Nove Zamky Monastery.*

Industrial constructions mainly till the year 1994.

Beata Polomová

Birth: 1959, Bratislava, Slovakia
1974-1978: Attendance of Technical College of Civil Engineering in Bratislava
1978-1983: Attendance of Slovak University of Technology, Faculty of Architecture in Bratislava
1983-1990: architectural practice in Stavoprojekt Bratislava, designing of new buildings in historical centre and urban planning
1991-1992: architectural practice in Wien by prof. V. Hufnagel
1993-1998: individual architectural practice + external PhD student of Faculty of Architecture STU BA
2003: authorized architect, a member of Slovak Architects Chamber
2004: obtained PhD degree; Developement of Lithurgical Space in the 20th Century-Function of Light in its Architecture
1998-2006: pedagogue at Slovak University of Technology, Faculty of Architecture, Department of Architectural Heritage Restoration, specialisation in restoration of sacral architecture and the night scenery of public spaces in historical cores.

Adriana Priatkova

Education:
1964-1968 Secondary vocational school of Fine Arts
1968-1974 Slovak Technical University in Bratislava, Faculty of Architecture
1986 Specialisation in the university pedagogics
1998 Postgraduate research studies, the field 35-01-9 - Architecture (USTARCH SAV in Bratislava)
Work experience:
1974-1982 Board of Main Architects of the town Kosice - a specialist for the historical central town zone
1982-1995 TU Kosice, Faculty of Civil Engineering, Department of Building Constructions - a professional assistant - since 1990 - a head of the Department of Projecting Studies
1996-1998 TU Kosice, Faculty of Civil Engineering, Department of Architecture - a deputy of the head of the department
1998-2002 TU Kosice, Faculty of Applied Arts, Department of Architecture - a deputy of the head of the department
2002-2006 TU Kosice, Faculty of Fine Arts, Department of Architecture- a deputy of the head of the department
Lecturing experience:
1982-1995 TU Kosice, Faculty of Civil Engineering- Engineering drawing, Typology I.,II., Atelier of typology- Reconstructions of civil buildings
since 1990 - History of Architecture and Art - Drawing I.,II.
since 1999 - Atelier of Architecture I.,II.,III.
since 2000 - The basics of Composition, The Architectural Creation
since 2005 - The basics of Architectural Composition, The basics of Architectural Creation - History of Architecture and Art I.,II.,III.
since 2006 - Atelier of Architecture I.,II.,III.,IV.
Research and artistic activities:
1991-1993 - Research: A-4/1-1: Renovation, reconstruction and modernization of apartment and civil buildings - Renovation and restoration of the chosen objects in the historic centre of the town Kosice
1993 - International Architectural Competition: Reconstruction of the area of the Technical University in Cottbus (Germany), Project of the University Library - a co-author.
1994-1996 - Research: 94-A-4/11: Data Analysis, connection of the database graphic information to the town information system and digital map in the chosen localities of the central town zone in Kosice
1995 - Study for the reconstruction of the gymnasium of the primary school at Kovacska str. in Kosice
1996 - Study for the reconstruction of the Pension Apex in Roznava
1996 - Study for the extension for the Roman Catholic church in Zaborske
1997-1998 - a deputy of the head of the institutional scientific research : Catalogue of the historical town reserve in Kosice - in 1999 it developed into the grant research project VEGA 1/6043/99
2006-2008 - a deputy of the head of the project : Architecture of Kosice of the "between W.wars" period (1918-1945) - Grant VEGA

UKRAINE

Kharkov State Technical University
of Construction and Architecture

Socio – Education Impact of National Heritage Research

Tetyana Sergeyeva
Kharkov State University of Civil-Engineering and Architecture

The valuable experience that was gained in the process of "Rescuing the hidden European wooden church heritage" project has brought additional results that were not planned initially. Being aimed at concrete practical elaboration of the methodology the project demanded participation of the multidisciplinary international working groups. Professors, post-graduates and students occurred in the unique educational environment where research and practical work on site was accompanied by communication with leading specialists in the field. Experts in architecture and engineering, restoration and reconstruction, sacred art and architecture history, philosophy and theology, social and pedagogical sciences, educational and developmental psychology as well as computer sciences represented different cultures and approaches that caused a real multicultural and multidisciplinary dialogue. As a result the project development has acquired a sustainable character due to opening the new social and educational prospects of heritage research activity as a powerful means of students' cognitive and personal growth.

Social aspect of the research activity deals with the idea of developing students as the true AGENTS of progressive changes in the field of national heritage maintenance through students' identification with their heritage. Indeed from the psychological point of view the problem of national heritage preservation is closely connected with self-identification. Unfortunately in our modern dynamic and integrating world the people experience a mass disorientation. There exists a real danger of loosing individual, group, social, cultural and even citizenship identity. Solving this problem is urgent both for Western world surviving the period of globalization as well as for the post-communist area that is in the state of active searching for new identities after old system collapse. It is a matter of common knowledge that psycho-social identity - is a necessary prerequisite for individual health, internal integrity and stability. It is the first and fundamental need of personality as well as very important need of life. It is particularly important for growing generation because personal and social identities are the main regulators of self-consciousness and social behavior. Identity is connected with self-definition including choice of aims, values, attitudes that the person follows in life. The feeling of identity is accompanied by the feeling of purposefulness and sense of life as well as assurance in external approval.

Under current situation the developing youths' identification with their cultural heritage is becoming a real problem because the financial situation in many post-communist countries does not allow saving the heritage that is gradually lost. New generation cannot appreciate their cultural heritage in its primary beauty. That is why they do not identify themselves with it. To tell the truth it is not easy to be identified with ruins that are neglected and feel proud of objects of cultural value that are in a miserable state. How this problem can be solved?

Even today having little opportunity to restore our architectural monuments in reality as a first step we can involve students into educational activity aimed at cultural heritage rescuing. In addition to acquiring concrete knowledge and skills the students can realize virtual graphic reconstruction of disappearing monuments by their own hands. It is well known that being personally involved in the activity an individual begins to value the objects of this activity through understanding them. Doing this work students can identify themselves with cultural achievements of their country. The fulfillment of this social as well as existential task can be amplified by integrating the principle of individual development into very process of concrete practical work of heritage rescuing as an educational resource. On the bases of their own practical work students can identify their role of the SUBJECT of the cultural environment development as a condition of their personal development. This activity is a good prerequisite for educating future agents of progressive changes. There is hope that in the future with more favorable financial situation this people can resurrect their heritage according to the examples of graphic reconstruction they have made being the students. As a practical output of this works can be issuing the catalogues of the country architectural treasures in its authentic beauty.

The proposed approach to students' development as the AGENTS of positive changes is based on the principles of Eco-Humanistic synergetic interaction as a means of mutual development ("Eco" stands for a

complex concept comprising social, cultural and natural environment). The essence of the idea is that our surviving, our qualitative life, our meaningful life in the changing transforming integrating world demands dynamic life strategy based on human-environment synergetic interaction. Understanding "human-environment" dynamic interdependence is a necessary prerequisite for organising synergetic interaction that in its turn provides the highest efficiency of mutual development. Sustainability of the process is provided by the interaction of the whole system of human (psychological), cultural, social, educational, economics and environmental factors. The key moment is accepting responsibility of a SUBJECT of the environment development as a condition of self-development. "Self-identification – self-development – self-realization" performs a synergetic triad representing the essence of personal efficiency not only in the measurement of contemporary life but on the existential level as well.

The efficiency of the self-development process is determined by the personal strategic existential sense-cognitive orientation. Its amplitude varies from phenomenological and social to spiritual world and is expressed as orientation for "surviving", "quality of life" or "sense of life". This amplitude determines the mode of actions which individual uses for realising his/her aims. According to the psychological laws these actions are transforming into personal abilities (for "self-development", "problem solving", "social interaction") and integrating into personality as individual qualities ("creativity", "empathy", "responsibility", "autonomy", "proactivity" etc). All these determine individual's professional, social and existential efficiency as well as social, cultural, and natural environment development. So students' activity amplifies their orientation.

New opportunities that the integrating world gives us have to be filtered through human values with respect to national peculiarities as well as concrete person self-identification. The education process is intended to determine value-cognitive orientation and strategies for the development of the external and internal resources as well as personal values on the bases of moral measurement of the actions used for the modern life problem solving. All these issues are expected to be analysed in their synergetic interaction. So students' activity develops values.

There is one more aspect. As it is obviously seen the human – environment interaction has its laws. Environment influences a human behavior (individual do not behave in the library the same way as in Disco or stadium. Even the organization of the tables in the auditorium influences the professor-students interaction). So interaction with well organized educational environment (enjoying architecture or nature, watching skilful work of experts; rescuing national heritage etc) can energize creative mind, bring new associations, new thoughts and even the feeling of belonging to the great culture of the world. So the environment educates students.

Another psychological mechanism that fosters the AGENTS development is the mechanism of self-identification with "a primary territory" that can radically change attitude towards the national as well as to the world heritage. The matter is that human beings identify themselves with their primary territory (there are secondary and general territories). Their attitude towards their primary territories is similar to their attitude to themselves. As a result they care about them. So if we consider not only our home but our country as well as a whole world as our primary territory we shall identify ourselves with it. As a result our attitude as well as our behavior can be changed. It means that the process of developing AGENTS of positive changes is directly connected with the developing students' attitude to the world as a primary territory.

Discovering common roots may even develop students' identity. On the bases of these findings students can find the way how to provide synergetic interaction with the dynamic integrating world investing their unique personal and cultural identity for the sake of mutual development. Indeed the experience gained within the framework of "Rescuing the hidden European wooden church heritage" project proved the fact that it is possible within the very process of work to develop the complex identity: human identity (understanding belonging to the world); social identity (understanding belonging to social categories like ethnos, culture, nationality); personal identity (self-definition in terms of physical, intellectual and moral qualities). In this context the observations made during the project activity showed very interesting results:

1. There were present three aspects of identification: orientation to the global environment (world culture), orientation to the unicity of expression (national culture) as well as orientation to the personal role (responsibility) in the project activity (internal culture). The process of searching for social identity in the broad context of human identity via one's own activity that in its turn led to the personal identity understanding gave birth to synergetic effect. This synergy serves a good modal for solving other contemporary problems because if person tries to raise own nation's moral and material funds, he/she is preparing to become the best members for world society and helps its development. As an essential result this person develops self in the very process of activity that is a good prerequisite for understanding interdependence and advantages of mutual development.

2. It is remarkable that there were observed two ways of self-identification development. One way was dealt with gradual understanding some data about self through understanding once own belonging to the definite culture. The other one was concerned an independent professional as well as social problem solving "What am I going to be?" in the context of the defining personal and cognitive resources in relation to the rescuing national heritage that led to the so called constructive identity. Even more, there were present four spheres of life that were significant for the development of identity: the choice of profession orientation and professional career; the affiliation and/or overvaluation of religious and

moral attitudes; the development of political views; the acceptance of social roles. All four aspects were implicitly included into our project activity that made it really efficient means for students' cognitive and personal growth.

3. The whole project activity was favorable for the educating AGENTS of positive changes in the field. It was based on psychological mechanism of interaction between identifications. The matter is that on the one hand the personal identification is a product of social identification. It is social by origin: the development of identity is a result of social experience, interaction with other people. At the same time being developed the personal identity begins to influence social identification.

4. There exists one more reason for AGENTS development. The changes in identification depend on the changes in social environment. At the same time the person defines his\her environment in the sense of aims, values and needs choice. The students that occurred in the project (if voluntary but not by the pressure of their professors) already had necessary prerequisites to become a real agents of the positive changes in the field.

5. It was observed that as a result of accepting new means of activity students gradually began to appreciate new values as well as develop professionally, socially and existentially significant personal qualities (such as empathy; tolerance; resourcefulness; proactivity; responsibility; successful presentation of identity).

6. Feelings of joyful expectation and curiosity were characteristic for the students during the period of work within the project that is very often accompanied an exciting process of searching for identities. It goes without saying that positive feelings energies and efficient work as well as self-development.

7. It was curious to observe so called exposed identity when in social interaction the images of experts were translated to the students to influence on their evaluation of identity.

All these facts give good witnesses for possibility of purposeful development of students human, social and personal identification in the very process of project work that creates good prospects for the development of true AGENTS for the positive changes not only in the sphere of national heritage resurrection but also in more broad professional, social and existential context.

If educational prospects are concerned the process of students' efficient development within the project work can be based on the original innovative educational Eco-Humanistic Technology of Self-Development (EHTSD). It is carried out in the interactive mode realising the concept of "Learning Cycle" that is perfectly realized within international projects' activity. The Cycle starts from concrete experience through reflection observation and abstract conceptualization to active experimentation. Original evaluation strategy allows performing the whole process self-monitoring (by experts, professors and students). For this purpose special computerized tools are available. International teams can be organized on the bases of the original strategy for efficient team selection. Brain storming technique, mind maps, surveys, tests and a set of original developmental techniques can intensify the work.

A whole set of specially organized events can be proposed for providing a system approach to the practical education process realization. They are the following:

1. organizing the international experts' activity within the event "**Experts' workshops"**:
   - elaborating a collaborative multidisciplinary curriculum for intensive theoretical course;
   - developing strategy for organizing student's practice "on site" aimed at gaining practical experience in the field as well as gathering data for graphic reconstruction of the architectural heritage objects and developing digital database;

2. providing international student groups' practice within the event "**Educational tourism**":
   - delivering intensive introductory course "on site" observing the state of the art;
   - organizing practical work (observing, data gathering, drawing, measuring, restoration) "on site" in the countries participating in the project for the purpose of acquaintance with the architectural heritage in the context of unicity, difference and interaction of local traditions and classical prototypes;

3. providing students' training within the event "**International students' workshops**":
   - conceptualizing acquired experience by means of theoretical generalization in the format of lectures delivered by the leading experts of the field;
   - developing data received in the process of practical work "on site" under the supervision of the experts in the field;
   - keeping in mind that a proposed field presume an essential role of the human factor it is reasonable to organize interactive lectures for gaining competence in the management of self-development in the very process of professional and training activity. This activity can provide the synergy of creativity with

personal values and resources (professional, social, existential) for educating an AGENT for positive changes in the field ;

4. providing collaborative practical activity within the event "**Virtual workshops**":
- summarizing the local situation in the field on the bases of the criteria elaborated within the collaborative project work and writing a report;
- presenting data of measuring works for graphic reconstruction projects, watercolors, paintings, drawings and graphic works;
- creating database for providing concrete reconstruction works;
- developing concrete restoration projects based on the knowledge, experience and data received during the collaborative work;

5. providing evaluation and dissemination activity within a whole system of events:
- organizing competition for the best restoration or graphic reconstruction project as well as for the best paintings, drawings, graphic works (event **"Best project competition");**
- organizing exhibition of the best projects as well as for the best paintings, drawings, graphic works (event **"International exhibition");**
- organizing conference on the problem including dissemination of the acquired experience as well as keeping results in perspective (event: "**International conference"**);
- issuing CD, educational book, architectural heritage catalogue as well as methodology on the bases of the activity results; providing copyright (event: "**Publishing activity"**);

If we describe the advantages of the proposed collaborative multicultural and multidisciplinary activity in terms of possible results the list will look quite impressive:

1. Concrete practical methodologies (know-how):
   - for selecting data and developing database for the purpose of reconstruction works;
   - for graphic reconstruction of architectural heritage;
   - for reconstruction of national heritage object;
2. Actual educational methodologies (know-how):
   - for curriculum based on multidisciplinary approach;
   - for innovative educational courses based of international collaboration;
   - for organizing educational tourism for architects and civil engineers;
3. Concrete reconstruction projects, databases and students' works;
   - projects of the reconstruction of national heritage object;
   - graphic reconstructions of architectural heritage;
   - databases for providing reconstruction works;
   - students works (projects; measuring practice works; watercolors, paintings, drawings and graphic works);
4. International competition of the best projects;
5. International exhibition of the best projects; the best students works;
6. International conference;
7. CD, educational books, copyright;
8. Catalogues of city architectural heritage graphic reconstruction;
9. Professional knowledge, skills acquired by the students and educationalists as well as personality development as an AGENT of positive changes in the field;
10. Original education technologies such as "Eco-Humanistic technology of self-development", "Evaluation strategy", "Ideal team selection strategy" etc.

This list is open and we are sure that it can be enlarged by more ideas both in practical and educational field. Collaborative multicultural multidisciplinary work gives rich and unique opportunity for successful solving common problems. This activity is based on synergetic interaction of leading experts striving for development as well as for positive changes.

Peculiarities of Ukrainian Sacred Architecture (Distinctive Features and Traditional Characters)

Igor Klimov, Vladimir Lopatko,
Kharkov State University of Civil-Engineering and Architecture

The Ukrainian sacred culture and, particularly, its wooden churches tradition is an outstanding European phenomenon, which have been formed on complex intercultural ground. One to be placed between eastern and western Christian brunches, Ukrainian culture has assimilated both characters as Eastern Orthodox as well Roman Catholic influence. Furthermore, pre-Christian cultural traditions have been placed in Ukrainian culture and they have been fixed in this unique phenomenon.

Ukraine places at the center of European cultural traditions crossroad. One to be limited by the seas from the south and by swamps and forests from the north, formerly this geographic place was represent natural passage from eastern to western areas. Beside the land way from east to west, also the way by rivers valleys was exist from north to south. Both ways communicated Hellenistic and Roman civilization with eastern and northern ethnic populations.

The ethnic roots, which formed this national traditions mosaic, are coming to historical past of this place and they are relate to ethnic groups and tribes of Slavic, Alan, East Goths, Polovetsians, Khazars and Hunns, Hungarians, who settled this territory not so long ago in common historical meaning – from fourteen till ten centuries ago, at early medieval period. Some these names have been disappeared from modern map, but they have been assimilated during following historical period. Some Slavic tribes of this area were relatively close to Polish, Slovak and Czech Slavic tribes (so-called Prague-Korchak group circle – from the Vltava to the Dnepr River). It is reasonable to define Ukrainian population as progeny of these historical ancestors. Therefore Ukrainian historical multicultural variety represents very significant phenomenon within European commonness.

Ukrainian territory represents exactly historical center of medieval Russian state. The name "Ukraine" is comparatively modern one, since about 17 century, after joining up with Moscow Kingdom. Truly, Ukraine had begun from Kiev Russia, which has been formed as the state at 862-882 CE as Slavic-Scandinavian community on the trade crossroad between Baltic area and Byzantine Empire. Scandinavian cultural influences have been placed here by Scandinavian dynasty of Roerich and their society (famous Ukrainian State Emblem has Scandinavian origin).

Since 14 century some part of previous Kiev Russia was united with Lithuania and since 15 century with Poland. This period has produced similarities between Ukrainian-Polish-Lithuanian cultural traditions: within ethnic costume, ethnic music, wooden constructions and so on.

During last centuries Ukrainian territories has been separated as administratively as well culturally. Until 20 century some parts of Ukraine was belonged to different countries: such as to Russia and Austro-Hungary. This differentiation also appears among distinctive features within Ukrainian cultural heritage.

That is why so many similarities between Ukrainian cultural features are obviously correspond with eastern and western traditions, with Russia, Poland, Lithuania, Slovakia, Czech, Romania and so forth.

***

As the Church applies to different nations, as well church architecture assimilates distinctive ethnic features, which reveal in sacred architecture regardless of style.

Christian sacred architecture includes syncretism of either ethnic or universal elements. Bright national peculiarities take place inside each denominational tradition: as in Eastern Orthodox as well in Roman Catholic.

Since second half of 19 century different investigators (as Russian and Ukrainian as well Germans) of Ukrainian wooden churches constructions were defined here unique combinations of native Russian and Scandinavian features.

Russian (northern and eastern) sacred tradition is quite close to Ukrainian, mostly by constructive technologies and by Orthodox denominational relation. But they are quite different by their reflected imagination meaning and characters. Russian wooden constructions are developed in horizontal beams sequences which formed peripheral walls and vaults.

Ukrainian tradition is relatively close to Norwegian by manifested imagination meaning and characters. They use distinctively leveled towers, which composed into long-ship structure, encircled by gallery below. But

they are different of principle by constructive technology. Scandinavian wooden constructions are using constructive skeleton, which is planked.

Within variety of Ukrainian tradition here are some samples of unification both famous traditions, where beams sequences and planked constructive skeleton are represent in one building.

One to be located at the middle of European area, to be inside multicultural interrelations, Ukrainian culture assimilated different eastern and western, northern and southern European influences. On the reach cultural ground Ukrainian nation have got produced native original traditions.

It is possible to recognize and differentiate several trends of Ukrainian traditions. One of them has Trans-Carpathian influences. This type represents by tree-chamber ship with predominated west tower. This type is very similar to Czech and Moravian tradition.

Other distinctive types represent low three-chamber churches with predominated central tower. They are most widespread on Ukraine from Carpathian forests up to eastern steppes. Delicate oriental plastic meets with western expression in three-chamber churches, which resemble to sailing ships on the background of the sky. These types are very close to traditions of south and middle Poland.

Among various traditions of Ukrainian wooden churches it is important to single out the following ones such as Boykivska and Lemkivska, which are spreading at western regions, and Limanska tradition, which characterized eastern regions. Limanska tradition has own distinctive features in shapes and specific eastern mystical interiors. Wooden cathedrals are not spread, but small parochial churches and chapels, which bring real ethnic character, usually have been realized as wooden construction.

Ukrainian wooden constructions tradition during long historical experience has own distinctions. It uses specific native natural materials. Complex climatic conditions demand original solutions – summer heat and winter frost demand thermal insulation. Construction requires effective protection against moisture, inner moisture condensate is forbidden because oil or tempera painting usually placed on the walls and roofs.

The Christian church has formed its own ordered literature, choral, icon painting and architectural symbolical structure. Wooden sacred architecture has obvious narrative factor which manifested doctrine of the Church. Specific language is very important element of the sacred architecture, which represented church doctrine manifestation in signs and symbols.

***

Relatively to actual restoration and preservation problems of the Ukrainian wooden churches heritage, contemporary situation in this sphere has distinctive troubles. During 20 century many treasures of wooden sacred architecture were destroyed. Some part of significant objects is survived, but their restoration needs professional approach and fundamental investigation.

The most difficult problem regards to financial troubles in new economical conditions. Also satisfactory professional level of restoration invasions has seeking for complex scientific approach, which must involve as historical, cultural and artistic as well constructive, chemical, biological spheres (regarding dendrology and investigation of fungi and insects specific).

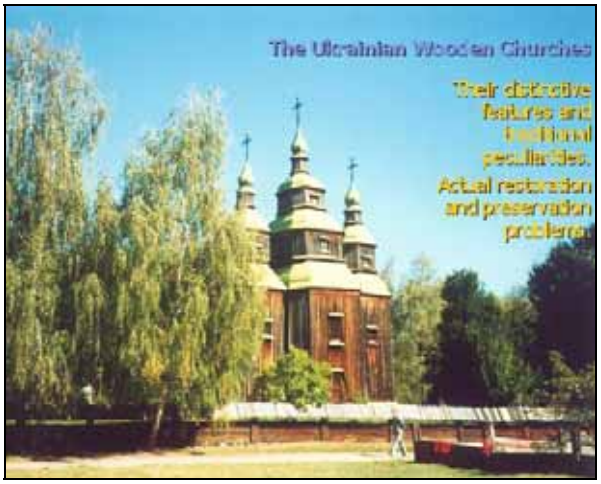
Ukrainian wooden constructions traditions in comparison with Polish, Slovak and Czech wooden constructions traditions give understanding of their obvious similarity common roots. Common international efforts in Middle Europe wooden churches heritage give good way for following progress within correct solutions of these problems.

Bibliography:

- Вернадский Г.В. История России: В 6 т. / Под ред. Б.А. Николаева – М.: АГРАФ, 1996. – Т.1: Древняя Русь. – 448 с.
- Вернадский Г.В. История России: В 6 т. / Под ред. Б.А. Николаева – М.: АГРАФ, 1996. – Т.2: Киевская Русь.– 448 с.
- Нечаев В. Малорусско–польское влияние в Москве и русская школа XVII века. // Три века. Россия от смуты до нашего времени. Том второй: Сб. / Сост. репринтного издания А.М. Мартышкин, А.Г. Свиридов, , М.: ГИС, 1991. – С. 77–105.
- Пушкарев С.Г. Обзор Русской истории. – М.: Наука, 1991. – 390 с.
- Русское градостроительное искусство. Древнерусское градостроительство X–XV веков. / ВНИИ теории архитектуры и градостроительства; Под общ. ред. Н.Ф. Гуляницкого. – М.: Стройиздат, 1993. –392 с.: ил.
- Рыбаков Б.А. Язычество древней Руси. М.: Наука, 1987. – 782 с.: ил.
- Таранушенко С. А. Монументальная деревянная архитектура Левобережной Украины. – К.: Будівельник, 1976. – 336 с.: ил.
- Burger, Erich, Norwegische Stabkirchen : Geschichte, Bauweise, Schmuck. Köln: DuMont –Kunst– Taschenbücher – Erstveröff, 1978. – s. 154.
- Rybakov B.A. Kultur und Kunst im frühmittelalterlichen Pommern (7. bis 11. Jahrhundert) // Wikinger und Slawen. Zur Frühgeschichte der Ostseevölker. – Berlin (DDR): Akademie–Verlag,– 1982. – S.263–290.
- Sedov V.V. Krivicen und Slovenen // Wikinger und Slawen. Zur Frühgeschichte der Ostseevölker. – Berlin (DDR): Akademie–Verlag, 1982. – S.226–233.

Actual Restoration and Preservation Problems of the Ukrainian Wooden Churches

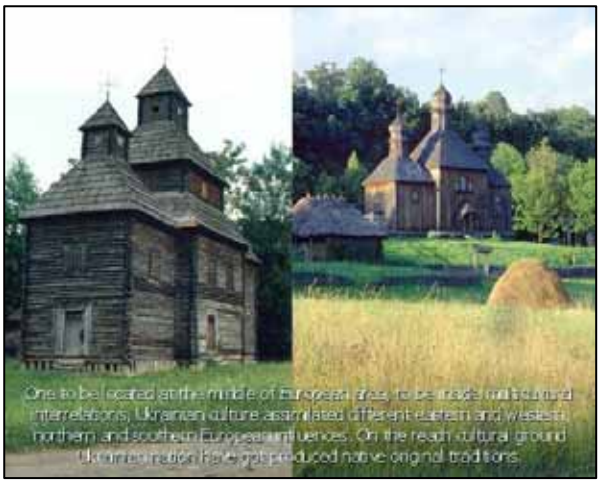
Nikolay Bolotskih, Igor Klimov, Vladimir Lopatko, Tetyana Sergeyeva
Kharkov State University of Civil-Engineering and Architecture



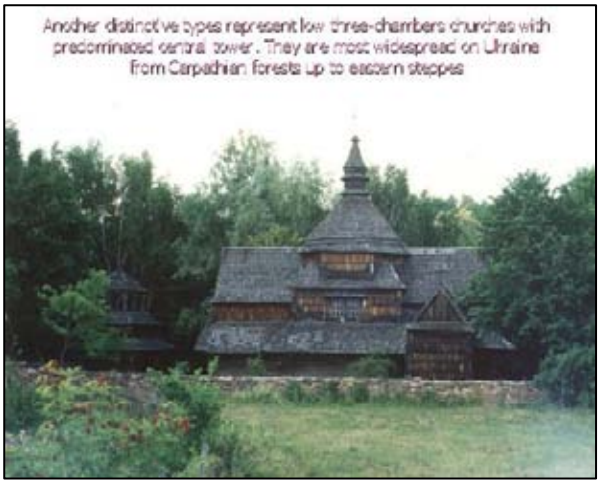
According to the fact that the Church belongs to different nations the sacred architecture assimilates distinctive ethnic features:

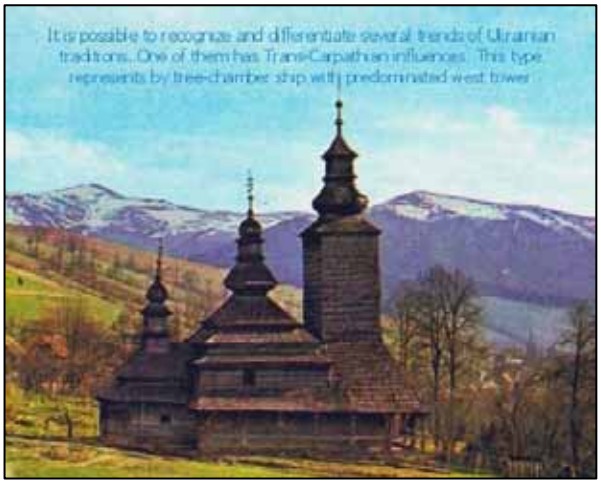
- Christian sacred architecture includes syncretism of both ethnic and universal elements;
- Bright national peculiarities take place inside each denominational tradition: both in Eastern Orthodox and in Roman Catholic;
- Ethnic features are revealed in sacred architecture regardless of style.

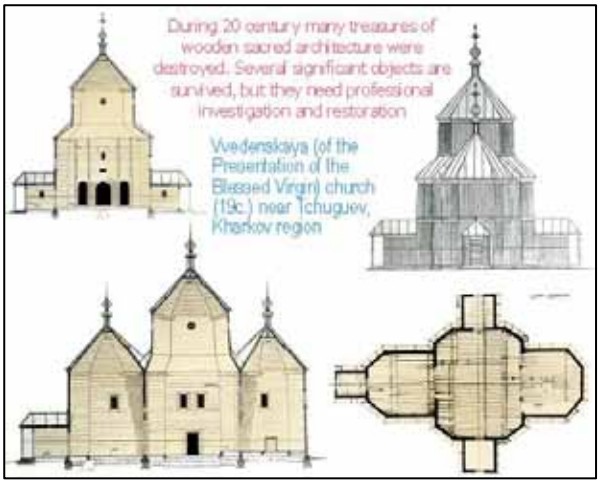
The Ukrainian sacred culture and especially its wooden churches tradition is an outstanding European phenomenon which has been formed on complex intercultural basis. Ukraine had arisen from Kiev Russia. Rus' was born in 862-882 as Slavic-Scandinavian community on the trade crossroads between Baltic area and Byzantine Empire. On the one hand the territory of Ukraine represents historical center of medieval Russian state. Being placed between eastern and western Christian brunches, Ukrainian culture has assimilated characters of both Roman Catholic and Eastern Orthodox influence. On the other hand being located in the middle of European area it occurred in the middle of multicultural interrelations, in the very centre of European cultural traditions crossroad: Scandinavian, Russian, Valachian, Hungarian, Polish.

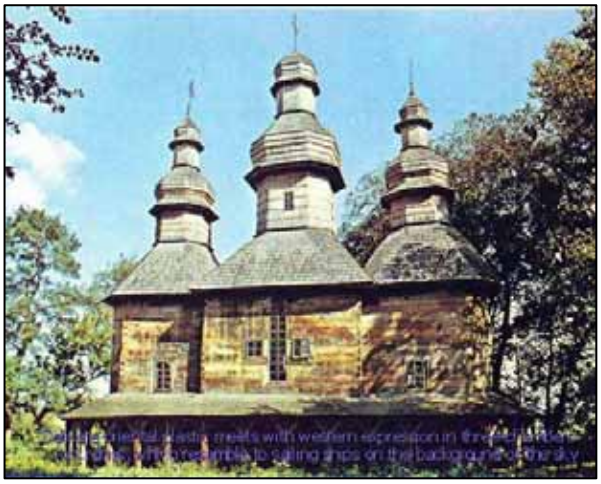


As a result Ukrainian culture assimilated different eastern and western, northern and southern European influences.
Russian (Northern and Eastern) sacred traditions are quite close to Ukrainian ones. These are mostly constructive technologies and Orthodox denominational relation. But they are quite different by their reflected imagination meaning and characters as well as by principle of constructive technology. Ukrainian traditions are relatively close to Norwegian one by manifested imagination meaning and characters. They use distinctively leveled towers, which composed into long-ship structure, encircled by gallery below. As a result Ukrainian nation have got produced native original traditions on the reach cultural basis.









It is possible to recognize and differentiate several trends of Ukrainian traditions. One of them has Trans-Carpathian influences. This type is represented by three-chamber ship with predominated west tower. Another distinctive type represents low three-chamber churches with predominated central tower. They are mostly widespread in Ukraine from Carpathian forests up to eastern steppes. Delicate oriental plastic meets with western expression in three-chamber churches, which resemble sailing ships on the background of the sky. Central and eastern area of Ukraine is represented by outstanding “Limanskaya” tradition with its own distinctive features in shapes and mystical interiors. They are no cathedrals, but small parochial churches and chapels, which bring real ethnic character.

So the folk wooden architecture of Ukraine was developed in the context of Eastern Slavic traditions. European architecture has also made its great impact on the Ukrainian culture. IX-XII century is connected with the time of architectural forms and constructions general unity development. In XVI-XVIII century the national

specific features of Ukrainian wooden architecture was intensively developed. Chronologically it coincides with the Baroque period. That is why its features were manifested in Ukrainian distinguish of style. XVIII century became the Golden Age for the Ukrainian culture.

Conservation Conditions for Wooden Monuments in Ukraine
(actual restoration and preservation problems)

Unfortunately in XX century for a long time the sacred wooden monuments conservation was almost neglected because of official policy caused by materialistic ideology of the communist state. More than that the substantial part of heritage were almost ruined. Anyway in our time about 200 outstanding monuments of wooden architecture are known. More than 600 monuments are considered to be the national heritage.

Today the priorities are gradually changing. The essence of the present time is the search for self-identification that expresses itself in searching for native historical and cultural roots. As a result intensive works were begun in the field of wooden monuments conservation (preservation).

There exist the following methods of restoration in Ukraine:

1. Conservation (preservation) of the object in its **actual form** by means of modern methods of reconstruction with maximum conservation of original parts;
2. **Fragment restoration**: the revival of the lost fragments of the object and removal of the foreign parts on the bases of scientific methods. These methods include chemical conservation of the wooden parts without construction demounting.
3. **Holistic restoration**: the reconstruction of the object in its **original form** on the bases of the saved samples. This method includes scientific methods of restoration, chemical (polymer) technologies.

The approach to conservation is efficiently realized as “Scansen” (Perejaslav-Kmelnickiy (1964), Lvov (1966), Zakorpatskiy region (1967), Kiev (1969) and conversation on site.

Ukrainian wooden constructions tradition during long historical experience has own distinctions:

- It uses specific native natural materials;
- Complex climatic conditions demand original solutions;
- Summer heat and winter frost demand thermal insulation;
- Construction requires effective protection against moisture;
- Inner moisture condensate is forbidden because of oil or tempera painting on the walls and roofs.

The most dangerous factor for the Ukrainian wooden churches is the humidification of the construction. At the temperature of 18-36 degrees the fungus is the destroying factor. The condensed dampness produces advantageous conditions for the insects that destroy wood.

The most frequently antiseptics used for conservation in Ukraine is: sodium fluoride, flint sodium fluoride, sodium dichromate, borax, boric acid, sodium pentachlorophenolate etc. The most efficient is the mixture of sodium pentachlorophenolate, borax and boric acid. This solution helps to protect wood against biological destroyers as well as against fire saving its natural beauty. The most efficient is the method of reassembly of the construction accompanied by its chemical processing.

There are the following problems concerning the restoration used in Ukraine:

1. **The problems of using authentic technologies**. Climatic conditions do not allow the contact between iron and timber because metal condenses humidity and leads to the quick wood decay. The usage of metal parts was undesirable because they accumulated moisture. Earlier the wooden churches were built without nails. The dowel-joint made from ironwood was used. Now the skills for this kind of construction are lost.
   The peculiarity of church construction in our region is a horizontal rows of timber logs. The skills of placing logs and insulating with moss are also lost.
2. **Problem of using authentic tools** (instruments). Modern saws and smoothing planes produce brush effect (the structure of wood becomes like velvet) and the humidity is kept longer in the wood. But old traditional technology using old axes pressed and ironed wood producing danced and flat surface. Now the technologies have been lost and besides we have no specialists in this field. New instruments and technologies allow to build wooden constructions rapidly but these constructions decay rapidly too because the microstructure of wood does not allow to save it for a long time.
3. **Problem of using authentic materials**. Earlier local materials were used. There were used different kinds of wood: for ground level - hard kind of wood (oak or larch) that were burned to prevent decay in the ground; for middle part – oil soft kind of wood (pine or fir tree); for roof coverage – hydrophobic kind of wood (aspen or alder) because they are easy-dry and easy-move water flow. This wood also breathes. Today felling is officially forbidden in Ukraine. The wood is transported from Ural. The material is not authentic for region. That is a reason for fungus. There is also some economical problem in providing this different kind of wood.
   In Ukraine the peculiarity of service is a wide usage of candles in Orthodox Church and a broad usage of untipiren substance. The fire risk is very high.
   In Norway a special treatment, plastificators are used. The main problem is that the wood does not breath as well as the fire risk is growing (two famous churches were lost).

Besides the church interior are painted by tempera. If the wood does not breathe the moisture is falling on the wall painting. As a result the fungus is appeared and the paintings turn black.

4. **Problem of modern architects**. The churches were reconstructed and the styles were blended. The question is how far the restoration should be done: back to initial form or to significant historical period? Wooden sacred architecture has obvious narrative factor which manifested doctrine of the Church. Specific language is very important element of sacred architecture. It represents church doctrine manifestation in signs and symbols. The language of architectural forms should be understandable. The church is the manifestation of the doctrine expressed by the language of architectural forms, by symbols, by signs. The modifications, the reconstructions, the remakes, the losing are like words divorced from the sentence that cut the narrative subject. Modern architects are not skilful in reading the language of sacred architecture that courses a lot of mistakes while producing restoration works.

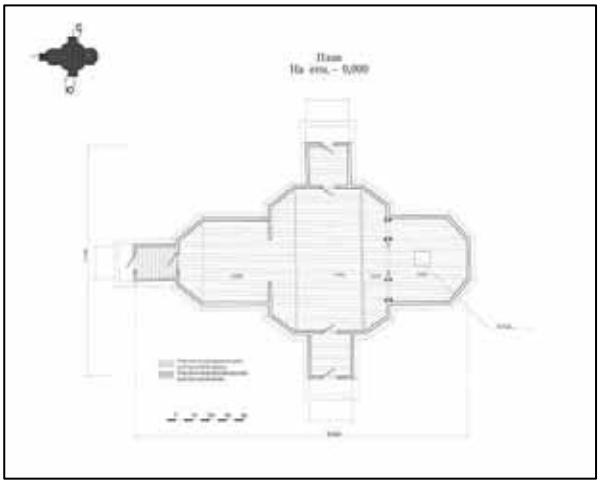
Rescuing "Introduction of St Virgin into the Temple" Church

Location

In Ukraine, in its eastern part (to be more precise in the centre of village Vvedenka of Chuguev region, Kharkiv district - the former Zmeevskoi district of Slobodsko-Ukrainian province) an ancient religious wooden construction of Ukrainian Livoberezhzhye – Church of "Introduction of St Virgin into the temple" – is situated.

Construction

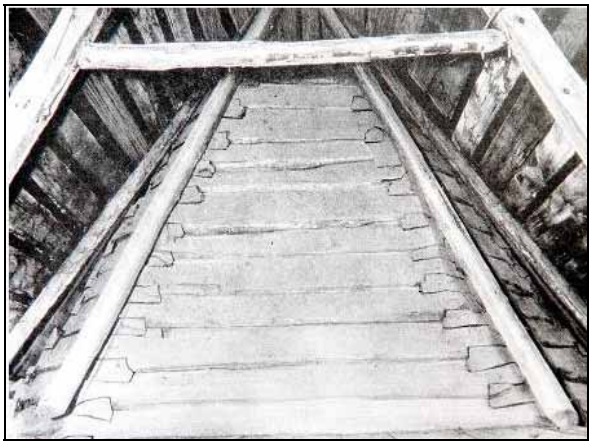
Vvedenskaya church belongs to the archaic wooden triple-shear (log-house) type of buildings with central two-high volume. The building is oriented west-east, it is cross-shaped and consists of two hem octagon (altar and outhouse) and octagonal central part and has a pyramidal composition. Triple-shear structure of volume-dimension composition that was created under the influence of baroque, form of plan, sloping walls, original absence of paintings in the interior. allow to ascribe this architectural monument to the ancient buildings that preceded Limanskaya school of wooden architecture of Livoberezhnaya Ukraine.



History of the church

Historical and archival research allows to determine that the first temple in this place was built in approximately 1655. After the fire of 1728 it was rebuilt and in 1777 it was disassembled because of decay.
The same year a new church with a separate bell tower was built of oak beams that remained till nowadays. During the time of its existence the church has been repaired for many times (in 1823, in 1829, in 1844, in 1856 and in 1876). During the Soviet period the church was closed and nationalized. It was used as a grain storehouse by a local collective farm artel. And only at the end of the 20-th century with great help of church community the church was restored.

Dramatic history of the church destruction



In the same period the church building was declared as a Ukrainian architectural monument. Work on the research of the building started in order to restore it. However at the beginning of the 20-th century a famous Ukrainian art researcher S.A. Taranushenko mentioned about it and wrote petitions. But the Soviet government took no measures in order to save this unique object. The church wasn't functioning for a long period of time, destroying insensibly.

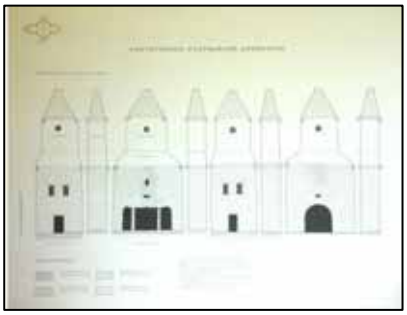
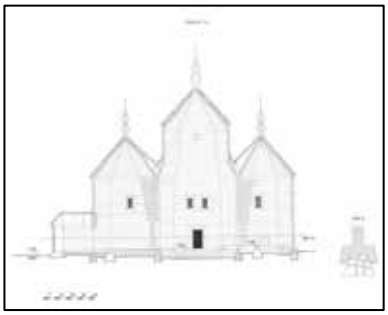
For the purpose of social property fire protection in the 60-ties of 20-th century the building was coated with clay and whitewashed on the outside. From time to time the roof was repaired. But the technical state of the temple was decreasing. The permanent dampening of the walls brought to the intensive destruction of the log-house. Especially it occurred in the places of parts connections. Under the layer of clay whitewash the ancient wooden boarding was quickly destroyed .

The exploitation of church as a storehouse leads to the destruction of the lower beam level. The lack of ventilation and premises' aeration lead to the appearance of mould. Later on the fungus spreaded over the entire surface of the walls and the wooden floor .

By the end of the 20-th century the temple was in an emergency state and it was necessary to carry out intensive work in order to save the temple.

History of church reconstruction

In this time favorable conditions for the church community revival were formed. The community addressed to the Soviet government with the petition to return them the building for many times and give money for the restoration of the temple. The branch of Designing Institute "Ukrproektrestavratsiya" in Kharkiv established in the end of the 20-th century has started the research of Vvedenskaya church. In 1990 for the first time a detailed church measuring was carried out as well as the technical research of wooden building construction, its foundation, roof (the authors – Lopatko V., Skripka V., Chernolihova A., Ryapolov V.) The specialists of the institute tried to test the state of timber under laboratory conditions that allowed to determine the way of architectural monument's rescuing.


Discoveries

In the process of research it was determined that in 1844 and 1856 Vvedenskaya church was painted with oil-paint. In the 40-ties of the 20-th century the lower beams of the building were changed for red brick basement because of decay.

Due to the technical reasons in 1859 the wooden belfry was pulled down and a new bell tower was build that existed up to 1932.

The specialists also found out that the icons of Vvedenskaya church of the second half of 20-th century also have artistic value. They belong to the lost nowadays Chuguev school of iconography. A famous Russian artist Repin I.E. originated from this school.

The work of S.A. Taranushenko played the unique significance in the research of the temple. He discovered the national wooden monument in the 20-ties of the 20-th century and that allowed to carry out the identification of external forms of the building, its proportions, and sizes.

After preliminary clearing of clay coating and the first uncovering it turned out to be a masterpiece of Ukrainian national wooden architecture that by a miracle has been saved up to our days.

Reconstruction work

The specialists of Restoration Centre prepared project proposals on saving the temple. Detailed enginering, chemical and technological researches were presented (Beletskaya E., Salnikova N.), full-size architectural and archaeological measuring, overture and prospect-hole were carried out, historical, archival and bibliographical researches have been gathered and summirized.

Unfortunately the restoration work of the church building had not been carried out. And only due to the efforts of the local church community and the authors of the project it became possible to restore the external wooden boarding, to repair metal roof, to strengthen the beams by clips. Unfortunately the governmental financing wasn't enough for the chemical conservation

of the beam timber. Local skilled craftsmen sewed up the internal walls with plywood and that is not favorable for the building aeration, for its preservation.
At present the external walls of the temple are painted with blue oil-paint again that doesn't coincide with the original intention of skilled craftsmen.
Unfortunately, the icons and all the church plate were not returned to the temple. The specialists of Kharkiv State Technical University of Civil Engineering and Architecture carry out further researches of the temple. Students of restoration profile are actively recruited for casual work. Though the scanty financing doesn't contribute to a successful work. And the unique monument of national wooden architecture of Livoberezhnaya Ukraine waits for its chance, for its true revival!

UKRAINE

Kharkiv State Technical University of Construction and Architecture

CURRICULUM VITAE

Sergeyeva Tetyana

Professor, Head of the Department of Kharkov State Technical University of Civil Engineering and Architecture; Supervisor of Innovative Educational Technologies Research Unit, Lecturer, Supervisor of Postgraduates
COURSES TAUGHT: General, Social, Developmental, Psychology; Human Resources Development; Innovative Education Technologies; Language Engineering
FELLOWSHIPS: Full-time course in English Language, Life and Institutions at University of Surrey (Great Britain); Lecturing in Natural Language processing systems at Brandenburg Technical University (Cottbus, Germany): Research work at King's College of Cambridge University (Great Britain); Lecturing in Eco Humanistic Technology of Self-Development at Lyon I University and Lyon 2 University (France); Head of the Evaluation of the Distance Learning Project "Industment" within Tempus-Tacis scheme (in collaboration with Germany and Austria); Head of the project "Human Resources Management" (Jep-24150-2003) within Tempus-Tacis scheme (in collaboration with Germany and Austria); Expert of the International Romualdo Del Bianco Fund (Italy).
RESEARCH: Education as a form of self-realization on the bases of self-cognition and self-development (multimedia interactive autonomous metacognitive course based on original Education Technology of Self-development); Cognitive process and personal development within computer aided training including distance learning; Human Resources Development including: communication; information; negotiations; moderation; presentation; conflict management; time management; group dynamics; leadership; teamwork; counseling; personnel selection and development; assessment centers, problem solving; making decisions; theories and modals of motivation and success; satisfaction by work; moral factor. Cross-cultural research of common European roots; Methodology of multidisciplinary dialogue; Human memory and thinking functioning within the process of cognition; Language engineering: speech understanding on the basis of thinking algorithm; NLP system based on psychological model of human thinking; MT system based on Sense Interpretation Technique
PUBLICATIONS: 16 monographs, 76 articles, 55 course books

Volodymyr Lopatko

CURRENT POSITION: Senior Lecturer of the Department of Principles of Architecture.
Kharkov State University of Construction and Architecture (KSTUCA)
EDUCATION: 1970-1975Kharkov Civil Engineering Institute, Dept. of Architecture, Ukraine
PROFESSIONAL APPOINTMENTS:
1995-present: Assistant Professor of the Department of Reconstruction and Restoration, Kharkov State University of Construction and Architecture (KSTUCA)
1995-1987: Chief Architect of the project of Restoration Institute (Kharkov)
1987-1975: Architect, Chief Architect of Restoration Office, Arhangelsk, Russia
COURSES TOUGHT:
History and Theory of Restoration Architecture;
Construction Materials and Restoration Technology
Principles of Historical and Modern Projecting
PROFESSIONAL HONORS, AWARDS, FELLOWSHIPS:
Since 1995 Member of the Board of the Union of Architectors, Kharkov
Since 1990 Member of the Union of Ukrainian Architectors
Since 1987 Member of USSR Union of Architectors
Since 2003 Member of the International Experts Committee of the Romualdo del Bianco Foundation in Florence, Italy.
LANGUAGES: Russian - native speaker, Ukrainian - native speaker, German - fair
RESEARCH:

- *History of Folk Wood monuments and architecture of Russian North, Ukraine*
- *Restoration and Reconstruction of the church architecture*
- *Specific of modern project and design*
- *Synergy of old and modern technologies of the construction*
- *Juridical questions concerning protection of the historical buildings and city environment*

PUBLICATIONS: 7 monographs, 10 articles
PERSONAL: Professional level in painting, artistic photography . Special skills in church architecture and old technologies.
FIELDS OF INTEREST: philosophy, common history, history of religions, mythology, ethnic cultures peculiarities, fine art, technique & engineering.

Klimov Igor

CURRENT POSITION: Senior Lecturer of the Department of Principles of Architecture.
Kharkov State Technical University of Construction and Architecture (KSTUCA)
Place and date of birth: Kharkov, Ukraine, 31.07.1960
EDUCATION: 1979-1984 Kharkov Civil Engineering Institute, Dept. of Architecture, Ukraine

- *M. Sc. in Architecture.*
- *Since 1997, post-graduate study in Architecture, Subject – Sacred Architecture, Thesis – the Architectural Iconography Semantics of Christian Orthodoxy Cathedrals.*

1998- 2003 University of the South Africa, Dept. of Theology, UNISA, Pretoria, RSA,
PROFFESSIONAL APPOINTMENTS:
2002-present: Senior Lecturer of the Department of Principles of Architecture, Kharkov State Technical University of Construction and Architecture (KSTUCA)
1989-2002: Research worker & Lecturer Kharkov State Technical University of Construction and Architecture (KSTUCA)
1984-1989: Architect General, Scientific Research Institute of Radiotechnical Measurements, Kharkov, USSR
COURSES TOUGHT:
History and Theory of Arts and Architecture;
Sacred Architecture & Sacred Art, Semantics of Architecture;

Icon Painting;
Architectural Design.
PROFESSIONAL HONORS, AWARDS, FELLOWSHIPS:
Since 2003: A member of the International Experts Committee of the Romualdo Del Bianco Foundation in Florence, Italy.
Since 1998: Study in theological Dept. at University of the South Africa (UNISA), Pretoria, RSA
1994-1995: Training in "Hagia Hora" seminar organized by German-Swiss Institute of Geomancy under the program of Sacred Art and Ecological Architecture (Germany)
LANGUAGES: Russian - native speaker, Ukrainian - native speaker, Polish – fluently, English – fluently, German - fair
RESEARCH FIELDS:

- *History and Philosophy of Arts*
- *History of the Humanity Culture, Culturology*
- *Mental Aspects in Contemporary Art- and Architectural Trends*
- *Theological Topic of Christian Sacred Architecture*
- *Liturgical and Iconographic Aspects of Medieval Cathedrals*
- *Cosmological Content of Sacred Architecture Amongst Different Cultures*
- *Contemporary Church Architecture Development and it's Artistic Expressive-Imaginative Context*
- *"The Nature Among the City" Appearances in Contemporary Postmodern Civilization*
- *The Nature, the Human and the Industry Co-existence within Megapolices Environment. Architectural Ecology Intentions*
- *Ecological Architecture Development in Post-Industrial Societies*
- *Energy Savings Technologies in Contemporary Ecological Building*

PUBLICATIONS: 11 monographs, 5 manuscripts
PERSONAL: Special skills in knowing of sacred art, church architecture and ecological architecture. Professional level in painting, iconography, artistic photography, computer artistic design.

FIELDS OF INTEREST: philosophy, common history, history of religions, mythology, ethnic cultures peculiarities, anthology of early music, fine art, industrial & artistic design, technique & engineering, biology and dendrology.

Bolotskyh Mykola
Academic, Professor, Rector of Kharkov State Technical University of Civil Engineering and Architecture
COURSES TAUGHT: Technical Equipment in Construction; Construction Technologies; Construction Machinery and Equipment
PROFESSUINAL HONORS, AWARDS, FELLOWSHIPS: Honoured Executive of Higher School of Ukraine; President Plaque "For Distinguished Service" (III degree); USSR Council of Ministers Prizewinner; Big Silver Plague & Diploma of Engineers National Association of India; International European Educational Project "Personal Management" within Tempus TACIS framework in collaboration with Hagen University (Germany); Collaboration with Handan University of Civil Engineering and Architecture (China); Collaboration with Brandenburg Technical University (Germany); Collaboration with Krakow Mine Metallurgy Academy (Poland); Collaboration with Posnan Polytechnics (Poland); Collaboration with Slovak Technical Academy in Bratislava (Slovakia)
PROFFESSIONAL SERVICE: Member of the Presidium of Construction Institutes Association of CIS; Member of the Presidium of Civil Engineering Academy of Ukraine; Member of the Presidium of Ecological Academy of Science of Ukraine; Member of the Board of Directors of North-East Centre of National Academy of Science of Ukraine; Vice President of Ukrainian Association "Personnel for Construction"; Vice President of the Council of Rectors of Kharkov Educational Centre; President of the Council Specialised in Awarding D.Sc Academic Degree
PUBLICATIONS: 22 monographs, manuals and educational books; 158 articles, 35 copyright certificates and invention patents; delivered reports at academic congresses, symposiums, conferences

ITALY

Collegio degli Ingegneri della Toscana
Florence

A Strategy for the Rescuing of the Ancient Wooden Churches of the Central Europe

Gennaro Tampone
Collegio degli Ingegneri della Toscana

Introduction

A phenomenon not known except to the specialists is the existence of an amazing amount of wooden churches built in the past and disseminated in the central Countries of Europe: Hungary, Lithuania, Poland, Transylvania, Ukraine, Russia etc.

In spite of its importance, in spite of the quality sometimes excellent of the specimens, the phenomenon is almost ignored by the official historiography on general architecture; one could say that only a comparably limited number of publications, mainly dealing with specific data, is available. Sometimes the phenomenon is the object of curiosity and presented as a matter of folklore.

An exception, till a certain extent, are the preliminary, direct surveys carried out by Josef Strzygowsky (1929) and David Buxton (1980). By the reading of these works it appears clear that there is (there was) a capillary net of these churches in the wide territory of Europe. Several of them have been destroyed by neglect, war, fire, dismantling; a few have been brought to open air museums.

It ought to be specified, anyhow, that the authors of the cited publications mainly deal with the formal, aesthetic, artistic (works of art, movable and immovable, in the churches), religious, even social and ethnic aspects of the phenomenon, not excluding the environmental ones. Only a very few of these publications enter into the details of the complex topics of the building techniques and the structural system; it is of major importance that hardly any of them, deals with the failure of the structural systems. Another feature of the cited publications is that plenty of them are specifically concerned about the wood - trees, species, working, artistic issues - and its decay. This can be explained in two ways, the severe weather condition of Central Europe, with temperatures varying in a very large range and, therefore, the accelerated decay, the vulnerability to biological agents etc.; the aspect of the decayed wood is very eye-catching and attractive indeed. The other aspect is that the load bearing structures in these regions are, generally speaking, oversized, very dense and sometimes overcrowded, also when covering modest spans, as a result of the abundance of timber; that means that the problem of the material is in general more important than that of the structural system. According to this essential side of the problems, in all cases the writers of books and papers, except a few exceptions, present the frame of the buildings only in the transversal section: a real perception of the spatiality of the frame, that exists anyhow and is of major concern in some specimens, is therefore not possible to the readers. Absolutely rare are the axonometric representations.

The churches object of the present research have a few factors in common: being scattered in the territory, for instance, at relevant distance from the cities, the timber from the nearby forests is used as the most natural material, the log construction as the simplest building technique. This has a few variants in the placing and connection of the logs.

A. OBJECTIVE OF THE RESEARCH

Motivations of the present research are therefore: to define the boundaries of the dominion of the wooden churches in Central Europe and, amongst others things, the temporal and territorial limits, recovering the sense of ensemble of the single religious complexes also trying to place them into a system; to inform people of this not secondary part of their patrimony and to discuss the common roots. A fundamental point is to save their physical integrity and the authenticity, pointing on the assessment of their value. As further natural issues, one can quote the inventory and later the catalogue, the proposal of the priority, the assessment of the typical decay of the material and of the failures of the structural systems, the general criteria for protection and intervention. The dissemination of the knowledge about them is an essential task, an important deterrent to prevent their alteration, neglect and destruction as well.

And conservation – maintenance, repair, strengthening, .. – is the principal aim.

B. METHODOLOGY

The adopted research methodology is based on the following points and phases.

The preliminary phase is the choice of the samples (the whole ecclesiastical complexes) which are significant for common typology – formal aspects, layout, building technique, structural system, decay and failure – or for diversity though belonging to the general ensemble; besides samples amongst those in the worst condition. The study of the samples follows. Deduction of the common or the singular features, building up the interpretation on those keys. Besides, the assessment of the decay and the failure.

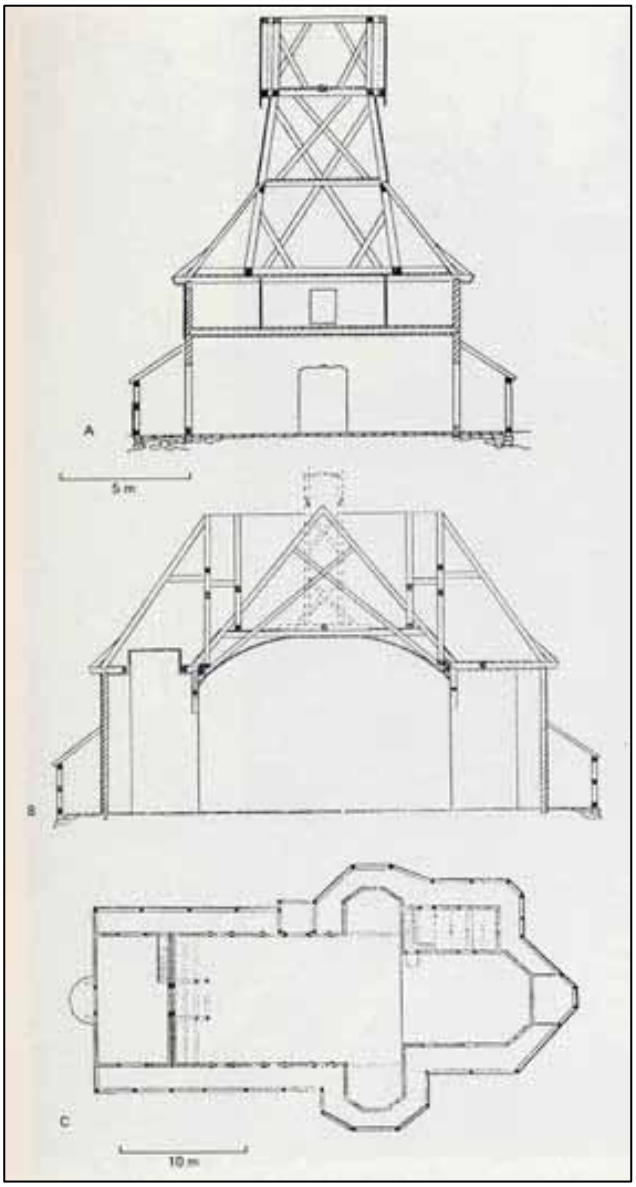
Settling the principles for their conservation.

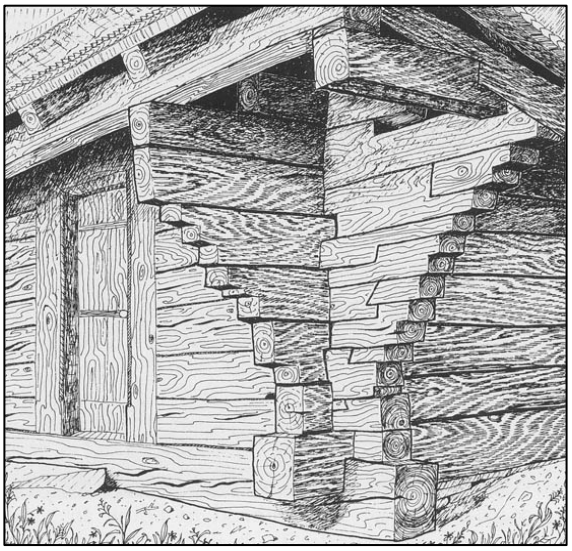
A first step towards an extensive analysis of the ensemble is the selection of the buildings severely damaged and in serious danger of collapse or disappearing; a specializing analysis of the single problems follows with the proposition of intervention methods for the conservation, extending the reflections to the social scale.

The samples, selected by the Scholars of the single Countries according to the quoted criteria which had been previously discussed and adopted, belong to an extensive range of architectures.

A further selection of the buildings according to degree of damage and priority of intervention has been eventually proposed.

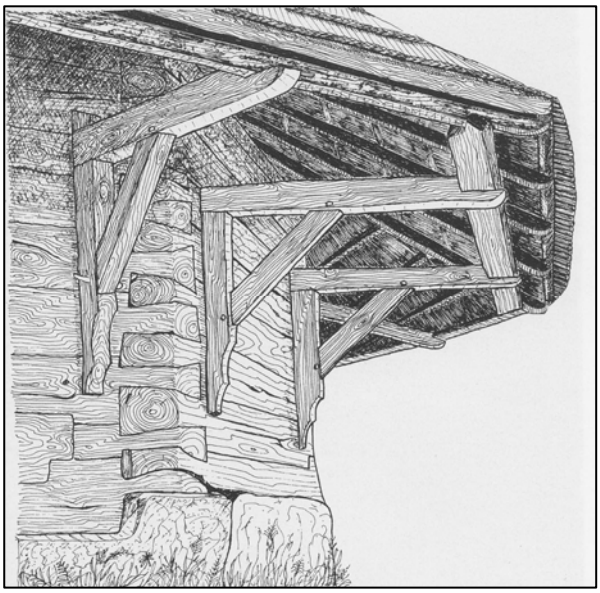
1. Typical example of drawing exhibiting also the structure but only in the transversal direction (Church of Lodygowice) (from Buxton D., 1981, *The Wooden churches of the Eastern Europe, an introductory survey,* Cambridge: University Press)





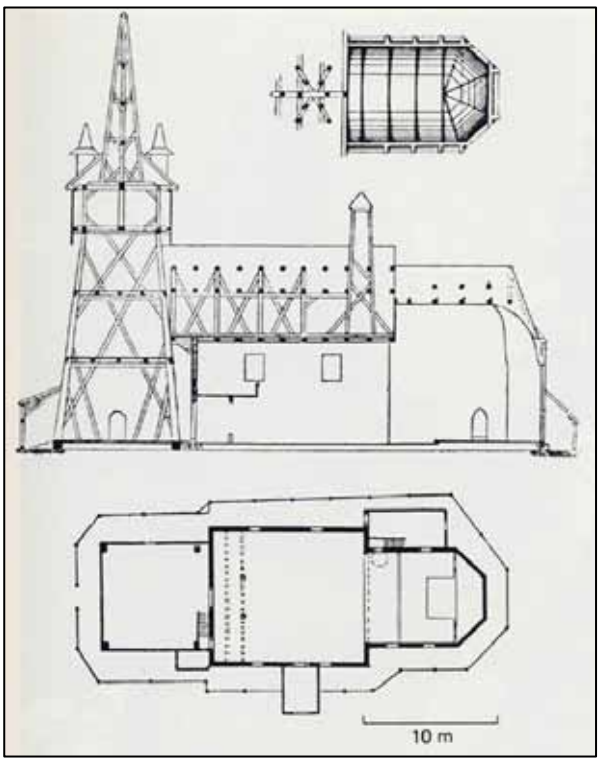
2. Interesting log construction for the Boyk Church at Rownia (south east Poland). Note the massive bracket, the clever system of builing up (or the product of restoration?) for the rigth element and the sophisticated roofing system (from Buxton, cit.)

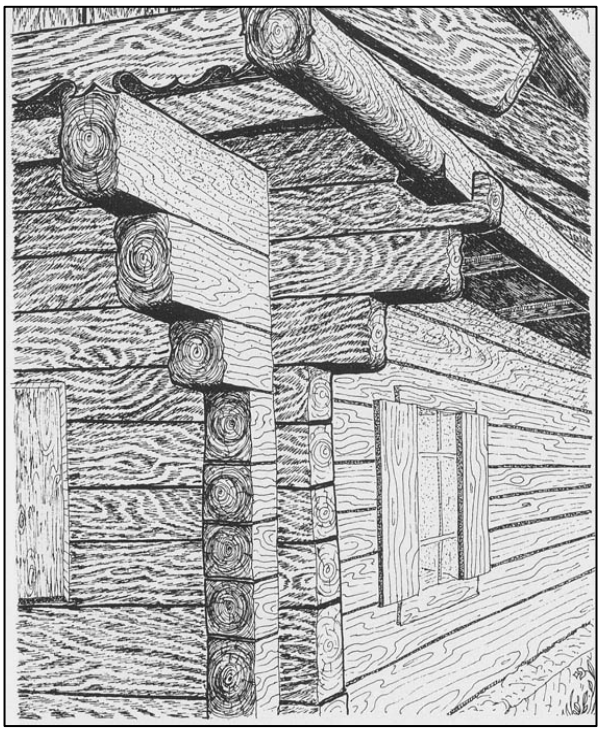
3. The slender body of the St Michel's Church of Katowice, Upper Silesia, possibly 1610.
Note the tapering of ther belfry, made of three overposed elements and the settlement of the entrance body, due to lack of foundation (from Buxton, cit.)



4. Attached brackets for the support of the eave, connection of the logs at an angle for the apse of the Catholic Church at Poniszowice, Silesia (from Buxton, cit.)

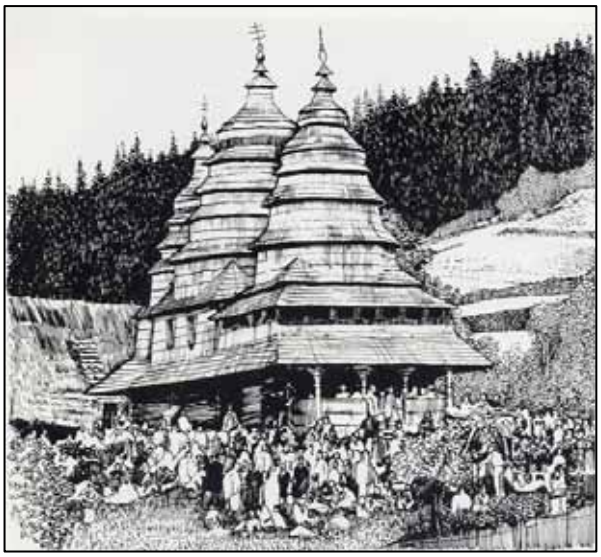
5. Tapered belltower and cantilevered connection of the roof of the church, braced roof of the wooden church in Wola Justowska, Cracow (from Buxton, cit.)





6. Eave support by cantilevered brackets. Tobelbad, Austria. (from Buxton, cit.)

7. St Nicholas Church at Krivka in the Carpatians, translated, with very interesting eaves and domes (from Buxton, cit.)



C. RESULTS of the STUDIES

Characteristics of the buildings

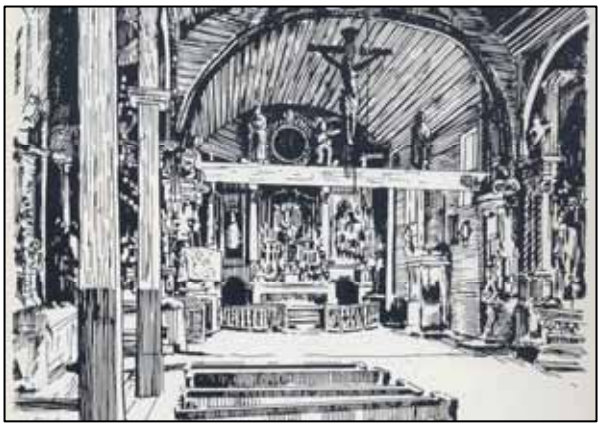
The weather conditions are very severe everywhere, about 70 degrees excursion.

The Polack territory alone counts 800 wooden ecclesiastical complexes, a figure which gives an idea of the problem and of the possibilities to collect them into a net.

The presence of domes in few buildings, especially the orthodox ones, confers special architectural qualities: domes are mainly present in the Cracovian Churches, where a higher technological building level has been observed in comparison with Warsaw, with interesting volumetric and spatial effects. The churches of Jedlinka (nice onion domes are also present), Łaszew have beautiful spires.
The architectural features of the domes or spires are generally not visible from the inside.

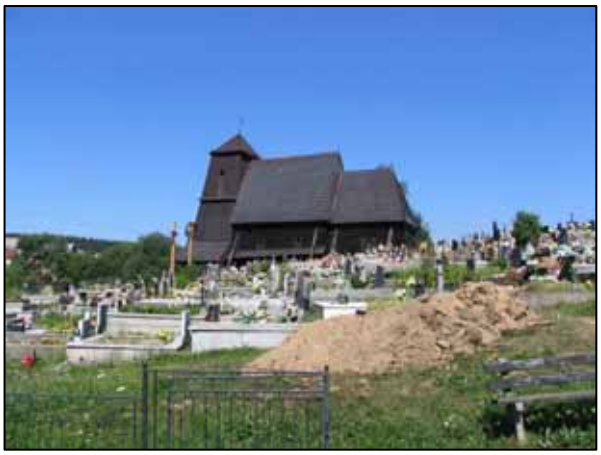
Some altars have an interesting architectural character as in Tvrdošín where there is a wooden, well proportioned, imposing late baroque altar. The churches studied in the three Countries are erected far from the main roads, far in the countryside, churches belonging to the spirit of the countryside. The site is always very interesting, charming, with a dense vegetation, sometimes with wonderful enormous, aged trees.

8. Fine door design of the St Leonard's church of Wierzbie, first half of the sixteenth c. (from Buxton, cit.)
9. Aisled church of Jezowe, southern Poland; typical lay out with aisled hall on pillars, narrower presbitery, iconostasys beam connnecting the two rooms (from Buxton, cit.)



10. Church of Łaszew (Poland), a massive articulated volume

11. Church at Sromowce Niżne (Poland)



12. Church of Chotyniec (Poland). The metal sheet on the left body is a recent arrangement

13. The huge complex of Trnové (Slovak Republic); the lay out is fully evidenced by the organization of the volumes

14. The Church of Miękisz Stary (Poland) shows perfect volumetric organization in the space and well studied proportions

15. The Church of Miękisz Stary (Poland) is planneed around the central domed hall
16. The interesting site of the Articular Church in Lestiny (Slovak Republic), with the articulated pathway





17. The polygonal apse of the church of Hervartov (Slovak Republic)
18. The onion dome of the church in Jedlinka (Slovak Republic)
19. Nice spire in the wooden church of Gaszyn (Poland)
20. Chotyniec (Poland). The force of the tradition in the design of the pillars: a source of inspiration for Konstantin Brancusi
21. The magnificent spatiality and the architectural conception of the wooden church of Kežmarok (Slovak Republic) are completed with a fine design of the elements like the spiral columns (insufficient, anyhow …)

Morphology, Layout

Without entering into the complexity of the different typologies and the related variants (see Trzigowsky, Buxton, Kunkel, quoted; other authors), one could say that they are characterized by the presence of two bodies always distinct, divided by the iconostasis; this is materialized by a beam in most cases or an arch.

A common feature of the layout is the difference in width of the two main rooms, i.e. the hall and the presbytery: the latter is narrower. The presence of vaults or domes, mainly in the Greek orthodox complexes, is to be considered a sign of planned distinction. Almost all the churches have spires.

Some churches have a polygonal apse; the church in Kadlub has a polygonal apse covered by an interesting octagonal pointed pyramid.

Other typologies can be proposed according to the shape of the roof, there can be two separate roofs, one for the presbytery and one for the hall, or one roof that covers both of them. These typologies can be, in their turn, combined with different positions of the bell tower which can be either completely separated from the main body or close or connected to it.

Planned perspective effects, especially in the body of the belfries, have been seen in the northern churches. A few belfries made recently are constructed with a metallic lattice structure (Gaszyn, Poland).

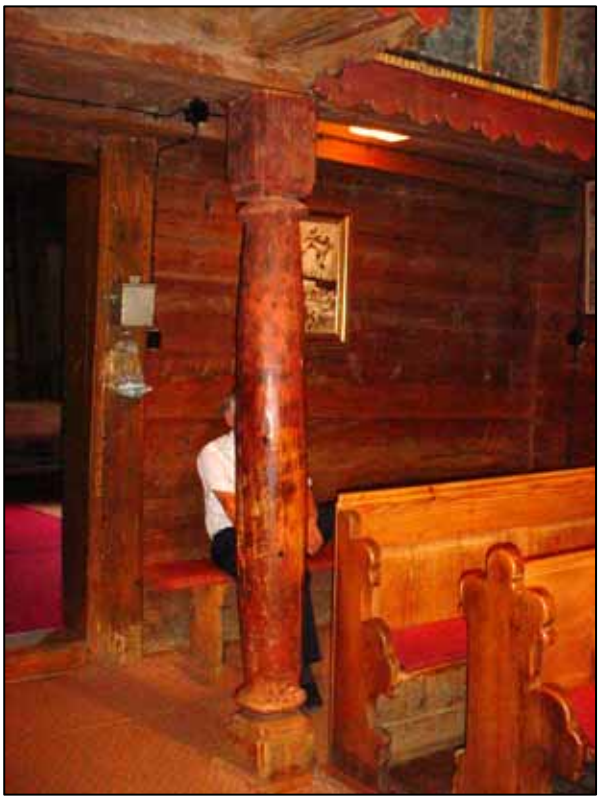
Bell towers are, in most cases, shaped as a trunk of pyramid with a shorter pyramid – the roof – lying on the first one. The tapering (see above) of the bell towers is very typical especially in the Warsaw region, probably to be interpreted as a heritage of the military buildings, say fortifications, where with the shape there was an attempt to confer taller appearance to the towers. Some of them are placed far from the church.

"Articular" churches have a very peculiar cross shape, which reflects the peculiarities of the cult. It is a matter of question whether the central pillars and the beams which interrupt the span of the floor are original or, according to the author's opinion, the result of a widespread strengthening measure.

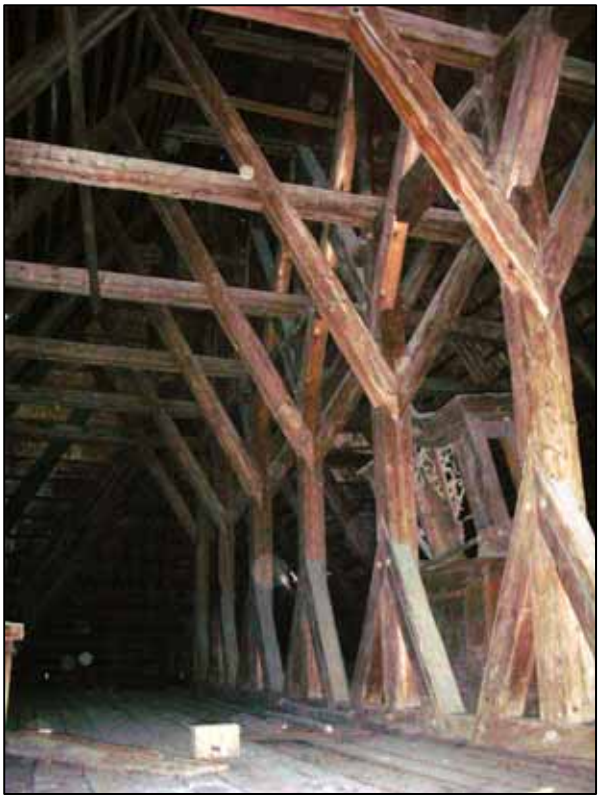
Many of the ecclesiastical complexes have been replaced in the religious function by modern churches as a sign of renovation and, at the same time, affirmation of identity in the temporal dimension. The two architectural complexes generally live together closely.



22. Polygonal apse and painted classical box ceiling of the church in Łaszew (Poland)
23. Interior of the church with a nice painted lacunar ceiling at Letowo (Poland)
24. Huge altar architecturally shaped at Jedlinka (Slovak Republic)




25. Fine architectural design of columns of the balcony of the church in Hervartov (Slovak Republic), with entasys and tapering, pulvin
26. The braced roof of Trnové (Slovak Republic)



27. Church of Trnové (Slovak Republic), detail of the carpentry assembly
28. The structure of the belltower seen from the interior, showing integration with new elements, at Hervartov (Slovak Republic)

29. Strong and efficient bonding of the logs in the walls of the church of Letowo (Poland). Note the assembly marks on the upper log
30. Perfect bonding in the wooden church of Chotyniec (Poland)
31. Church of Trnové (Slovak Republic)

32. Hervartov (Slovak Republic). The vault of the apse

33, 34. Classical architectural elements in the paintings of the vault of Miękisz Stary, made with bent boards
Classical architectural elements – bearing walls, pendentives, polygonal drum, polygonal dome - in the church of Miękisz Stary (Poland)
Note the classical architectural paintings on the ceiling of the dome

35. A monoxile bifora window of the church of Tvrdošín (Slovak Republic)

36. Nicely designed structure of a door in the Articular church of Lestiny, Slovak Republic

Building Techniques

The soil of the planes is mainly composed of alluvial depositions of sand and clay. Therefore there is a typical frequent occurrence of soil settlements and landslide, that in general assume the peculiarity of horizontal or inclined translation, with the main component in the horizontal direction.

The horizontal translation of the soil is the primary cause of structural failure of the studied buildings, which are mainly placed directly on the soil, with no foundation, in the best cases placed on single rough stones or on a simple intermediary body of rough masonry along the perimeter; the floors rests generally on a grid of rough timbers directly placed on the soil.
The external gallery for the protection of the believers, especially if large, gives a substantial contribution to the protection of the base and the walls of the building from the rain, the insects etc. and to the stabilization of the whole building.

The building materials are those of the woods and forests, mainly pine and oak.
The logs squared are dressed with the axe, with visible effects in the lateral light.

The building technique is that of the log construction, the *carcass* (see Brownhill), using squared logs that are put the one upon the other in close contact; some vertical wooden pins connect couples of logs, but more to ensure stability during the building phases than for the long service life of the construction; some nice pins are to be observed in Chotyniec.

A very suitable dressing of the logs, for the functionality of the construction, is to be observed in the Tvrdošín church and others.

The logs are connected by end joints, sometimes shaped in a very complicate way as in the Church of Trnové.

Assembly marks of the wooden members have been observed (Brezany, others).

A few typologies of the building technique have been detected, amongst these the constructions with entire or half (mainly Slovakia) logs, with the round or squared logs; in Slovakia another type has been observed (Brezany) that has logs put at a distance in vertical, the room in-between filled with poor mortar or earth, the whole frame being sometimes covered with plaster; in the same church the base of the log construction is larger than the medium level, i.e. the first part of the walls is not vertical but inclined inwards, to be considered an efficient device to contribute to stability.
In a few cases the insertion of shaped planks of variable thickness is made as a compensation of the irregularity of the logs (Trnové etc.).

With regard to the joints, some of them have the projecting part of the joint in the middle of the end of the log, which is indented to both the upper and the lower log; at the bottom some indent only the upper one. One of the most distinguished is Chotyniec where the projecting part is very large. An original feature is to be found in Brezany where the pillars end with a fork to allow the blades to enter.

Assembly marks have been detected in Brezany and in other few churches.

The log construction is generally covered, at the interior and outside the building, with vertical boards or planks which have the role of insulation, protection and stabilization. They are generally planed at one face outside and inside, ready to receive, in most cases, internal decorations and paintings. But in Tvrdošín the logs were roughly dressed, outside, with the axe and their appearance is rough and strong at the same time.

Some roofs are composed of a system of rafters directly connected at the top, also connected by a mid-level false chord and by the floor structure. In most cases they are composed of a double row of pillars resting on transversal beams and supporting the rafters. Some roofs are composed of complicated (hyperstatic) trusses. A general concern to brace the structure of the roof in the two principal directions is spread.

In Lestiny the roof of the church is made of thin rafters stiffened in the middle by a false chord; an upper rafter allows the graceful change of slope in the inferior part of the roof.

In a few cases the buildings have no eaves or so, and the effects of this situation is the rainwater wetting and spoiling the walls at their base, with fungi attacks and rotten material as a final result.

Shingles, in the majority of wood, are connected with the system of the hips and grooves. The shingles and, in many cases, the facing boards are nailed along the edges with the effects of checks (cracks due to the shrinkage), as it has been observed in Jedlinka church and several others, passing in the middle of the double row of nails or directly trough the nails line.

Many churches have been switched today to have a metal sheet covering instead of wooden material or straw, with welding of the single sheets.
Miękisz Stary, one the most interesting churches visited by the team, shows the presence of a fine timber vault (still to be surveyed closely and carefully) lying on a polygonal drum and pendentives, with a central oculus with upper spire; the presence of nice paintings of architectural character similar to the real architectural order erected in the Tomb of Diocletian in Split, Dalmatia, is a fundamental element of further interest. The intrados of the vault is made of boards which have been bent to follow the planned curve profile.
The interior of the churches is completed with simple ceilings of boards, mainly longitudinally placed. In some cases the ceilings have a cove. Some churches have very interesting vaults (Kežmarok, Miękisz Stary etc.); the vault system of Miękisz Stary is extremely elaborate and made like a masonry vault (see above).
All the ceilings are painted or decorated. The decoration with lacunars (painted false ceiling or box ceiling) of Łaszew is of great interest.
Interesting doors with nicely shaped lintels have been observed in Łaszew and Lestiny.

37. The materials are of good quality and well dressed, the building technique is suitable except for the absence of clogging in the Church of Trnové (Slovak Republic)
38. The exterior walls of the Church of Brezany are made, typically for Slovak, with logs put at a distance, the gap being in-filled with mortar. The logs are of mediocre quality and twisted, the connections not made in a suitable way
39. Miękisz Stary (Poland). It is evident the timber grid on the soil for the support of the floor

The structural system

The builders of log construction and of the wooden churches object of the study, rely on the box effect for the stability of the construction, namely on the difference of width of the rooms in order to realize a (partial) transversal stiffening with the vertical elements (transversal walls), at both sides of the smaller rooms; the iconostatic beam co-operates in a substantial way. In fact the typical construction has no real frame. The belfry, when adjacent to the front wall, co-operates to the stability; but in some cases (Brezany, Trnové) it is inclined inward (effect of the settlement) and supported by the hall of the church.

The roofs are generally heavy. It ought to be noted that the trusses, when present, are wind braced, in several ways, mostly at the base, in the longitudinal direction. The joists and the upper boarding largely contribute to this effects. The spatial, three-dimensional conception of the roof carpentry is generally pursued.
It must be observed, anyhow, that the carpentry of the roof, the boarding of the shingles and the covering are often too heavy, certainly to withstand the snow loading and the wind, in relation to the thickness of the walls.

The outer gallery, when present, gives a not negligible contribution to the stability of the complex, hall and presbytery.

The Articular Churches in Slovakia have a better spatial organization because they have a cross section with four wings; besides, a camber is generally present in the central blades; the presence of other members – uprights in a double row supporting longitudinal beams - seems to be an addition in order to strengthen the whole system. They are the same in all the churches visited.
Besides the very interesting vaults seen in Miękisz Stary, where the ceiling is composed of bent boards nicely composed to follow the planned profile etc., also the board ceilings in Kežmarok are of great interest. In the Jedlinka's churches the pavilion vaults are obtained reducing progressively the span of the log construction.

The present roof of Jedlinka is completely new; surprisingly it has no bracings of the rafters. The roof of Lestiny has been replaced by the badly-made present one, a work of the XIX c.
The roof of the Lestiny church is composed of too thin rafters, stiffened by a false chord, but deformed; interesting is the presence of a partial upper rafter to change the slope of the roof at the bottom.

Strengthening works made in the past

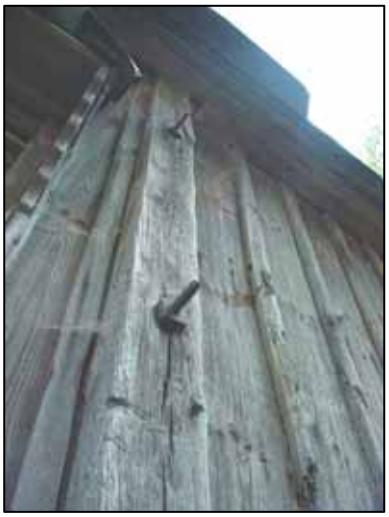
In several cases one can find spontaneous, candid, minimal repair work which were useful to stop further damage or failure or collapse, almost always in harmony with the original building technique and the structural system.

In almost all the churches in the area investigated, a similar kind of intervention is present, i.e. the apposition of couples of uprights, at intervals, to the vertical walls, parallel to the facing boards, and connecting

all the stuff with bolts. The nuts of the bolts, square in shape, are made in the ancient way, cut from a bar of wrought iron and perforated; some additional industrial bolts have been put in the past years. The system does not work perfectly, when the uprights twist their efficacy is compromised.
Very recent are a few propping works but made without a concern for the slenderness of the poles, really too thin in comparison with the loads and the length: the repair was not efficient at least in two or three cases, by instance Brwilno and Boguszyce, Trnové (Slovakia). The props are too long, besides they were left in the rain without protection: now they are bent by point loading, one is twisted, several of them are rotted by fungi and eaten by beetles.
But in Trnové large strengthening works are to be found, not only the shoring with the wooden props already quoted, but the three dimensional steel frames at the base of the belfry, which is still affected with inclined translation proving that the failure is still active.

Partial replacements of members in the roofs are rare.

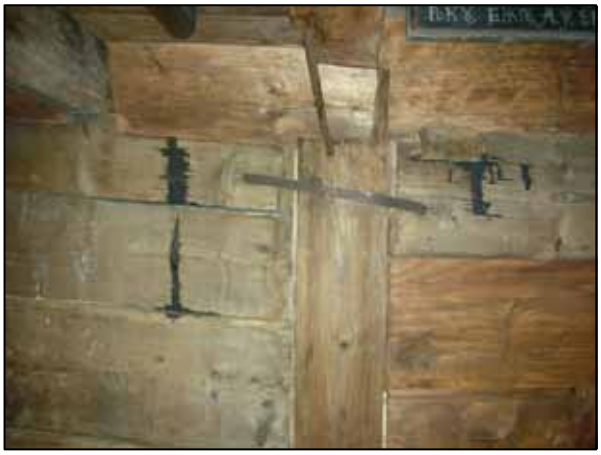
Some partial replacements of bent uprights have been seen in Jedlinka, a measure to be connected with the rottenness of the pillars and the inclination of the belfry.
Copying, anyhow, is not easy and sometimes the interpretation of the old artefacts is difficult and the replacements in style are wrong, put in place without a real understanding of the structural behaviour of the ancient building technique in the specificity of the material (Chotyniec)
A complicate strengthening system of a floor, made with nicely shaped wrought iron, was observed in Jedlinka.



40. Strengthening devices (plank and bolts) at Miękisz Stary (Poland)
41. Miękisz Stary (Poland) detail of the pre-industrial bolt
42. Huge shoring work for the church of Trnové (Slovak Republic), affected with rigid rotation caused by soil settlement

43. Detail of the shoring work for the church of Trnové (Slovak Republic)
44. Long and bent (own weight, point loading) props for the unsteady church of Boguszyce (Poland)


45. Strengthening wooden props put at the side of the original spiral columns at Kežmarok (Slovak Republic)



46, 47. Iron cramps at the Jedlinka's structure (Slovak Republic)

48, 49. Old repair work of the base of the bent pillars of the Church of Jedlinka (Slovak Republic)

50, 51. Old and new repair work of the base of the bent pillars of the Church of Jedlinka (Slovak Republic)

52. Insertion of new elements in the structure of the roof of the church of Letowo (Poland)
53. A propping of the roof structure

54, 55. Biotic attacks at the wooden shoring system of Trnové (Slovak Republic), maximum at the sections close to the steel boxes; the inside prop is bent and trwisted
56. Detail of the bending and twisting of the prop shown in the preceeding picture

The present condition

The walls and the coverings of the churches which are not covered by varnishes assumed a very charming silver colour, which is due to the combined action of the ultraviolet rays and to a biotic action.

The metal sheet coverings, seen in many churches, are very dangerous for the possibility of moisture condensation, which can start a mechanism of biological attack.

Many are the causes of decay of the material: the lack of foundation and the direct exposition of the bases of the building to the humidity of the soil, the lack of rain goods such as channels, drainage, varnish protection, …the insufficient protection of the roof when the eaves are too narrow to avoid the rain water making the construction and the walls wet, the solar activity, the lack or inappropriate use of superficial treatments, the lack of maintenance, the wrong bonds (as for the shingles of a few buildings which have been pinned with two nails) causing checks and the entrance of water to the interior of the building and the inaccurate connection of the board facings to the log construction. Diffuse wet rottenness by fungi, detected in these cases, is the obvious consequence of these defective conditions.

A few ring shakes have been detected at the log construction of the St Francisco from Assisi in Hervartov (but the logs are well squared). In a few, deformations of the foundations (Trnovo etc.) due to creep have been detected.

In Miękisz Stary also algal settlements are present.

Due to the general lack of foundation or to the presence of inappropriate ground bodies together with the instability of the soil, many of the buildings studied have stability problems.

Indirect witness of past instability problems are offered by repair interventions as collar ties at the foundation level (Brwilno, Jedlinka, Trnové etc.), replacements of pieces (members or facing boards), carried out over the years.

The charming complex of Hervartov has been spoilt by the presence of electricity posts. Cables and other electrical devices spoil the interior of the church of Letowo.

Problems of stability

It ought to be recognized that the log construction is very sensitive to soil settlements, to irregularity of the pieces and to inaccuracy of bond. The churches of Trnové, Brwilno, Miękisz Stary, Jedlinka (apse and belfry rotating towards the main building) and others suffered from landslide or soil settlement. A clear sign of the soil settlements, characterized as cited by prevailing horizontal component, is the bending of the internal pillars as in the church of Jedlinka, (spiral columns).

Also the repair have often been broken.

These effects are evident in the Church of Brwilno, province of Warsaw, where the concrete tie put at the base, evidence of the lack of real foundation and of a recent measure to prevent further failure, is vertically broken by axial tension.

They are also evident, by similar cracks and huge timber shoring paralleled by steel ties, on the church of Trnové, Slovakia, where the building is resting on an inclined soil. The wooden props, already bent (as effect of point loading; the failure of the building was still active when they were put in place) and rotted by fungi, are too long, inefficient and dangerous for people walking around, and they cause more weight on the broken structure.

The deficiency of foundation, therefore of insulation against humidity, is also cause of rising moisture, lethal for the wood.

57. Church of Brwilno, Poland. General rotation of the building caused by soil settlement, erosion of the banking, wrong inclination of the placement soil etc.
58. Brwilno. The main horizontal components (tension) of the soil settlement are made evident by the vertical crack of recent concrete tie at the foundation level
59. Brwilno. The main horizontal components (tension) of the soil settlement are also evident by the widening of the base of the building

60. The imposing church of Trnové (Slovak Republic) was hit by a large uniform soil settlement with rotation of the entire building to the left and relative rotation of the belfry towards the hall.
61. Inclination and bending of the base beam of the Trnové bell tower

The geometrical imperfection of the logs and their deformation after the putting in place cause reduction of the abutment, i.e. of the contact surface. Causes of deformation are humidity, irregularity of the grain, makeshift bond, insufficient thickness of the logs (of the walls), objective difficulties in keeping the barycentre in the wall etc. All these factors contribute to a situation of instability of the walls.
The effects of the horizontal translation are the widening of the base of the building, the presence of vertical crack with maximum width at the base, in progression towards the roof. Besides, loss of verticality of the walls, disassembling of the log construction, …..

Summing up, the effects on the construction detected during the inspections are:

- Deformation of the members, deformation of the walls
- Disassembling of the log construction
- Lack of stability with rotation of the walls
- Deformation of the shoring works (the failure is still active)

The roofs are generally steady.

62. Wide intermediate soil settlement of the wooden church of Jedlinka, evidenced by the inward rotation of the belfry and the extreme body on the left. The settlement was started by the vertical translation of the central body

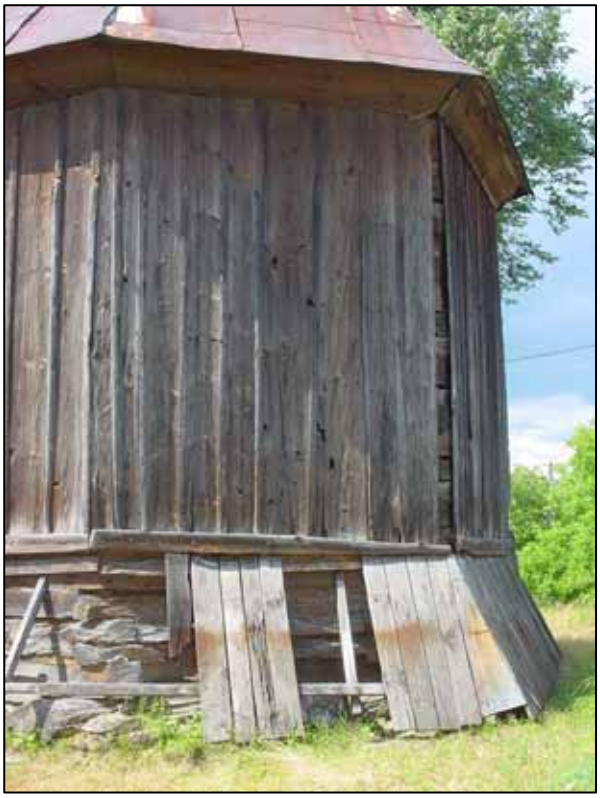
63. Rotation of the whole body of the church

64. Miękisz Stary (Poland).

Soil settlement

Decay of the materials

Biological attacks by fungi, beetles of various genera have been observed, as in Brezany. The same for shrinkage, warpening, deformation and checks due to shrinkage.



65, 66. The Church of Miękisz Stary, Cracow circle, shows also algal settlements

67. The log construction of the Church of Brezany (Slovak Republic) is extensively attacked by beetles

68. Miękisz Stary (Poland).
Beetles making themselves busy on the walls of the church

69, 70. An interacting combination of algal, entomatic, micotic attack to the basement of the Church of Miękisz Stary is also responsible of a structural failure

71. Biotic attacks to the "new" props of the shoring put in place at the church of Trnové

D. DISCUSSION

Authenticity

How can the authenticity of these churches be defined ?
The authenticity is relying on the following elements: the several parts which constitute the ensemble, in their stratification; the structural configuration, according to types or differing from them; the accumulation of the signs, also as a semantic value: on a more general level, the continuity of the sacred function, the permanence of a well identifiable constructional system, the common fate of decay, failure, abandon; the presence of the memory of the ancestors of the community buried in the annexed cemetery.

The following important question is: what to save or conserve?
The values are: the characteristics of the rural site, the countryside, and, more in general, the relation with the nature; in this respect, the environment, the vegetation, especially the centenarian plants, the presence of works of art; the sure presence of plenty of the original material, also in the complexes which were subjected to wide replacements (mainly of the facings). Besides, the value of each element in the ensemble which goes far beyond

the national limits: we could also say the continental borders if we think to the log cabin construction built in America by Scandinavian emigrants.

The precious silver colour assumed by the exterior facings of the buildings is a sign of long exposition to the climatic factors, is a kind of *patina*; it is a value to be preserved. Documentation of the past decay or failure must be left on the body of the building.

E. PROPOSITION

The values to be conserved

First of all, the values to be preserved are the whole system, the organization of the structure, the original material, the sign of the history of the building.

Respect for the history also means to conserve the parts which are added and that are today coherent with the whole and significant part of the building.

How to conserve?

The obvious answer is: the maintenance, as first step, with the most appropriate techniques (especially for the strengthening of the structural system) and the suitable materials (traditional or modern), mostly wood etc. But it is important to say that the pedantic reconstructions of the missing parts, the replacement of members, the filling of the gaps or *lacunae* and similar imitative operations, especially for the works of art, are alien to the modern theories and practice of conservation. That means to follow the present cultural trend in architectural and artistic conservation avoiding replicas.

Conservation is dissemination, co-participation as well. Other projects similar to the present one must be promoted in Europe.

The strengthening:

First concern is the stabilization.

Concern for the soil is essential in order to save the ancient wooden churches. In some cases of soil settlement, erosion or land sliding, a set of measures are necessary, these include: the strengthening of the tall banks on the rivers, as it is the case of Brwilno, for instance where the soil was deeply eroded and taken away a few years ago, the formation of a supporting wall (anyhow problematic for its weight) and the inclination of the soil surface to ease the flowing of the water.

Underpinning is probably a necessary measure in Brwilno, Trnové etc.

In any case the structure itself of the buildings in general needs strengthening, achieved by improving the transversal connection and stiffness. This applies to Brwilno, Miękisz Stary, Trnové etc.

The unsteady walls need bracing and a few roofs as well.

The strengthening devices must be visible, adjustable, syntactically in keeping with the structural system; the strengthening devices applied in the past must be conserved, as a witness of the care and attitude towards the monuments, as well as the manifestations of the failures; they must be repaired or improved, if necessary for the stability. For instance, the strengthening works made in the past, i.e. putting double planks in vertical and tying them with bolts, proved to be inefficient because their action does not apply to the system but only to the local member, the wall. These devices must be repaired. The same for the shoring made with poles.

Tension steel cables –ties – are to be selected according to their way of contributing to stability: the minimal thickness, the minimal visibility, the ease of adjustment etc, and they should be used instead of compressed timbers. The strengthening devices, in fact, should be visible but minimal, efficient, adjustable; "didactic", at the maximum possible extent.

General Conservation

When dealing with damaged buildings of historical importance or of monumental characteristics, the conservation methodology and procedure are of the highest importance.

The appraisal phase is fundamental.

The nature, the extent, the progression of the damage to the materials, the construction and the structure - members, units, structural system - have to be assessed; a contemporary activity concerns the survey of all the characteristics of the building and its structural system.

The research on the most important causes of decay and failure must be done keeping in mind that never one factor is the only responsible of all the effects detected: the causes of the failures, in other words, are always several even if in general only one confers the principal features of disease.

There is then the possibility of a feed-back, interpreting the symptoms as possible interacting effects of the detected causes.

At the end of this process, that could be called of the investigation workshops the time of the interpretation and evaluation comes, i.e. of the diagnosis; this is a global judgement.

The prognosis, always an extremely difficult item, is the forecasting of the evolution of the damage and failure in the future.

The therapy must be limited to the elimination of the causes or, if this is not possible, to their control; these actions are to be followed by the intervention works on the construction: repair, strengthening.

Alteration of the structural system in order to upgrade its performance levels is not allowed, as a principle, on the monumental buildings.

The care or prevention of the biological decay is pursued first of all removing the humidity and ensuring appropriate ventilation to all the parts of the buildings. The ancient material should be retained as much as possible where the decay is advanced and the use of the acrylic resins in order to keep together the corroded parts is advisable.

The treatments against biotical infections must be ecologic, made according to the European Norms; in fact many of the traditional products, creosote for instance, in recent times have been declared carcinogenetic.

The metal sheets which cover several churches, (therefore a waterproof, a humidity-proof cap, certainly the worst situation for a timber construction) should be replaced by more friendly material, wooden shingles, for instance, may be of modern design. Some of the metal sheets are old and show a nice *patina*; a few samples of them (Miękisz Stary, for instance) can be conserved.

For each complex a general reclamation is to be planned: removing electricity, telephone posts, invading cables, panels, meters and accessories too close to the construction and, as is the case of Kadlub, large writings (see picture) etc.

The safety devices and the functional installations are to be introduced trying not to alter the general condition of the buildings, without operating devastating insertions in their very body.

The lighting (see other contributions), exterior and interior, is to be planned in such a way as to avoid the reflections, the direct hitting of the beam in the eyes of the believers or visitors, so as not to alter the perception of the space, especially inside. UV and infrared rays are very dangerous for works of art, especially those made of wood, with organic matters etc..: so special lamps or filtering devices are necessary. In order to appreciate all the chromatic components of the architectural elements and of the works of art, lamps with high colour temperature have to be used. Any lamp has to be placed far from the wood. For a better distribution of the light on entire façades, architectural features, works of art etc. the modern leds are a suitable suggestion.

Three levels lighting, for moving around, reading, appreciating the works of art, are advisable.

With the exterior lighting, there are two main points to stress out.

The first is that an exceeding luminosity of the buildings in the dark of the night is unpleasant, there is an alteration of scale, besides it gives a false idea of the urban or rural setting, almost annulling it, because the lighted buildings float as boats in the darkness.

It is fundamental not to invert, with an inappropriate lighting, the architectural values of the masses: for instance, it is upsetting to see a building that is strongly lighted in the parts which are in the shade during the day (porches, for instance) and to keep at a lower level the other parts, the external ones, which are clear in the sunlight.

Remote drive (radio waves) should be introduced to avoid cables, switchers, panels etc. and to reduce the risk of fire.

The possibility of modifying the light according to the kind of ceremonies should be planned: joyful ceremonies like baptism and wedding require quite a different atmosphere than a sad funeral.

Plays of colour and light like *son et lumière,* should never be made on monumental buildings.

Most of the paintings present in the churches visited are in a poor condition. They must be restored; but it is personal opinion of the author that restoration in this case should not mean the repainting of the *lacunae*, the contents of which are a loss for ever, but cleaning, fixing the colours etc. It is the case of Jedlinka where a valuable painting in an architectural frame is strongly decayed and many parts of the human figures are missing: the lasting authentic parts are not to be spoilt by new, subjective parts.

72. Site of the Church of Hervartov (Slovak Republic), spoilt by electricity and telephone poles and cables, concrete posts etc.
73. Old and valuable architectural wooden casing for a series of paintings, with *lacunae*, of Characters. Church of Jedlinka**.**

74. Wrong design of the copy of braces, responsible for the crack of the woden elements at the connection sections

75. Gaszyn (Poland)

F. FURTHER ANALYSIS

The general survey, for each building, shall be extended to the soil, the water table, the technical details and to the structural parts. The geometrical survey must include sections in the two main directions which are therefore always necessary to document the complex organization of the members of the carpentry with several braces. There is the need of a systematic anatomical campaign and analysis, the assessment of the woods condition, the structural analysis, the dendrochronological assessments (particularly easy because the heads of the shafts are in sight).

Deep historical and documentary surveys are necessary.

Vulnerability to local risks is to be assessed for each one of the ecclesiastical complexes; prevention will follow.

Priority of Intervention Among the Wooden Churches Visited

Gennaro Tampone, Antonello Usai, Michela Semplici
Collegio degli Ingegneri della Toscana, Florence

The purpose of this scheme about priority of the intervention among the churches visited during the field visits in July 2006, is to understand which are the churches in immediate need of restoration, reparation, conservation. In these cases it is very important to sort out what are the main factors for the preservation of each single monument are; their architectural quality the extent of their damage and their risk of disappearing. To make this kind of evaluation it is necessary to attribute to each factor its own values and combine them all together.
This simple form arises from the considerations formulated during these visits, through notes, pictures and sketches. In order to obtain a rational result we have divided the general state of conservation into four fundamental sectors: deterioration of materials, covering condition, soils settlements and structural failures and we have decided to mark 1 to 5 the conservation level, where 5 is the best.

	Country and name of the Church	Deterioration of the materials	Covering condition	Soils settlements	Structural failures
1	Poland - **Miękisz Stary**	1	2-3	3-2	1-2
2	Poland - **Boguszyce**	3-2	3-2	4-3	3-2
3	Poland - **Brwilno**	3	3-2	4-3	4-5
4	Slovak Republic - **Trnové**	3	4-5	4-5	3-2
5	Poland - **Sromowce Niżne**	3	3-2	4-5	4-5
6	Poland - **Kadlub**	3	3	4-5	3-4
7	Slovak Republic - **Jedlinka**	4	4-5	4-3	2-3
8	Slovak Republic - **Lestiny**	4-3	4-3	4	3-2
9	Slovak Republic - **Brezany**	3-4	4-5	4-5	3-4
10	Czech Republic - **Sedliste**	3-4	4	4	4
11	Czech Republic - **Albrechtice**	3-4	4	4	4
12	Poland - **Trzepowo**	3-4	4-5	4-5	4-5
13	Poland - **Łaszew**	3-4	4-5	4-5	4-5
14	Slovak Republic - **Kežmarok**	4-5	4-5	4-5	4-3
15	Slovak Republic - **Hervartov**	4-3	4-5	4-5	4-5
16	Czech Republic - **Guty**	4-5	4-5	4-5	4-5
17	Czech Republic - **Prašivá**	4-5	4-5	4-5	4-5
18	Poland - **Chotyniec**	4-5	4-5	4-5	4-5
19	Poland - **Dębno**	4-5	4-5	4-5	4-5
20	Poland - **Pilichowo**	4-5	4-5	4-5	4-5
21	Poland - **Rebowo**	4-5	4-5	4-5	4-5
22	Poland - **Grebien**	4-5	4-5	4-5	4-5
23	Czech Republic - **Bystřice nad Olší**	5	5	5	5
24	Poland - **Rdzawka**	5	5	5	5
25	Poland - **Letowo**	5	5	5	5
26	Poland - **Gaszyn**	5	5	5	5
27	Slovak Republic - **Tvrdošín**	5	5	5	5

A Bibliographical Research on the Hidden European Wooden Churches Heritage

Michela Semplici
Collegio degli Ingegneri della Toscana

During the works on the project "*Rescuing the Hidden European Wooden Church Heritage, an International Methodology for Implementing a Database for Restoration Projects*", carried out with the support of the European Community and under the scientific direction of the Collegio degli Ingegneri della Toscana, we discovered a very interesting unknown heritage. We discovered that in Eastern Europe there are lots of wooden religious architectures located in isolated sites, completely out of tourist routes. Only some of them have started to be popular in the last five years thanks to their inscription on the World Heritage List of UNESCO, like the Churches of Peace in Jawor and Swidnica in Poland and the Wooden Churches of Southern Little Poland. The other wooden churches, such as the churches chosen for this project, are quite hidden in the countryside of Eastern Europe and most of them are at risk of disappearing for neglect and fires. These churches are very similar to each other but at the same time so different for many reasons. In fact the construction techniques that we found are summarised in two or three types such as the wooden frame structure and the log construction technique. But the architectural typologies change a lot because of the different cults or the typical customs of the sites.

The first step to preserve this hidden heritage is to make an inventory of every church present in the territory of reference, and the second one is to study and analyse every building through a scientific survey and from the point of view of the structures, materials, construction techniques, degradation, decay and of ancient and future restoration works.

First of all it is important to make a bibliographical research to understand what kind of documentation already exists on this topic, if only a local tourist documentation exists or if these religious buildings were the object of scientific researches or thorough investigations in the past.

In our project only Poland, the Czech and Slovak Republics are object of attention, but for this bibliographical research we chose to extend our interest to the surrounding areas, because there is a great deal of buildings very similar to the project's ones. The extension of the area is very important to understand the influences and differences existing between the wooden churches and for the implementation of a global research able to know every building in relation with a bigger geographical area.

With the purpose of understanding what the value given to these hidden religious buildings is and of finding out scientific documentation, we decided to make this research directly in the Data Bases of the three most famous documentation centres in the world about heritage: the UNESCO-ICOMOS Documentation Centre in Paris, the ICCROM Library in Rome and the Getty Conservation Institute in Los Angeles. The research was carried out through a combination of different queries, geographical location, wooden constructions etc. During this bibliographical research we found some difficulties with the search systems usually used in data bases. In fact among the keywords, sometimes it is impossible to combine information about materials and kind of structures and, besides, the short summaries that accompany most of them are usually very superficial from the point of view of the construction techniques. For these reasons this work cannot be considered complete, but at the same time we must consider it as a very important mark which is useful and essential to start a scientific research on wooden religious architectures in this geographical area.

Biographical References

Source	Setting	TOPICS		
	Region or Single Country	GENERAL INFORMATION	BUILDING TECHIQUES AND STRUCTURAL SYSTEM	DEGRADATION, RISK CONSERVATION AND RESTORATION
ICCROM	Eastern Europe	Various authors, 2000, *Wood structures: a global forum on the treatment, conservation and repair of cultural heritage,* West Conshohocken: American Society for Testing and Materials	Various authors, 2000, *Wood structures: a global forum on the treatment, conservation and repair of cultural heritage,* West Conshohocken: American Society for Testing and Materials	Various authors, 2000, *Wood structures: a global forum on the treatment, conservation and repair of cultural heritage,* West Conshohocken: American Society for Testing and Materials
ICCROM	Eastern Europe	Kelley SJ.; Obsitnik V., 2005, *Wooden wonders of the Carpathians*, (ICON world monuments, 2004/2005 Winter)		
ICCROM	Europe	Sanz N. (ed.), 2002, *Living wooden culture throughout Europe*, Strasbourg: Council of Europe Publishing		
GETTY	Eastern Europe	Buxton D., 1981, *The Wooden churches of the Eastern Europe, an introductory survey,* Cambridge: University Press	Buxton D., 1981, *The Wooden churches of the Eastern Europe, an introductory survey,* Cambridge: University Press	
-	Eastern Europe	Sirelius UT., 1907, *Uber die primitiven Wohnungen der finnischen und ob-ugrischen Völker*, (Finnish - Ugrische Forschungen, 7)		
-	Eastern Europe	Strzygowski J., 1928, *Early Church Art in Northern Europe*, London		
-	Eastern Europe	Strzygowski J., 1929, *Altslavische Kunst*, Augsburg		
-	Eastern Europe	Thompson M.W., 1967, *Novgorod the Great*, London		
-	Eastern Europe	Rajewski Z., 1970, *Biskupin*, Warsaw		
-	Eastern Europe	Lundberg E., 1971, *Trä Gav Form*, Stockholm		
-	Eastern Europe	Hansen H.J., 1971, *Architecture in wood,* London		
-	Eastern Europe	Pöttler V.H., 1972, *Führer durch das Osterreichisches Freilichtmuseum*, Stübing bei Graz		
-	Eastern Europe	Goberman D.N., 1970, *Wooden architectural monuments in Trans-Carpathia*, Leningrad		
-	Eastern Europe	Makushenko P.I., 1976, *Wooden vernacular architecture of Trans-Carpathia*, Moscow		
GETTY	Eastern Europe			Various Authors, 1978, *Wood protection: technical conference sponsored by DEGESCHin Baden-Helental*
-	Eastern Europe	Pavlowitch D., 1962, *Les vieilles églises serbes construites en bois*, Belgrade		
-	Eastern Europe	Cvitanovic D., 1973, *Drvena sakralna arhitektura u sjevernoj hrvatskoj (Timber sacral architecture in norhern Croatia)*, (Arhitektura, 146-7), Zagreb		

GETTY	Bulgaria	Velev V.A., 1983, *Cultural monuments in Bulgaria, made of wood* in: "International symposium on the conservation and restoration of cultural property: the conservation of wooden cultural property 1982, Tokyo and Saitama". Seoul, Kungnip Munhwajae Yon'guso		Velev V.A., 1983, *Cultural monuments in Bulgaria, made of wood* in: "International symposium on the conservation and restoration of cultural property: the conservation of wooden cultural property 1982, Tokyo and Saitama". Seoul, Kungnip Munhwajae Yon'guso
GETTY	Bulgaria			Michailov A., 1975, *Conservation des constructions solides en bois en République Populaire de Bulgarie*
ICCROM	Czech Republic	Sopák P., 2004, *Inventarizace památek ve Slezsku v 1. polovine 20. století,* (Zprávy památkové péce, Vol. 64, N. 6)		
ICCROM	Estonia	Eesti Arhitektuurimuuseum= Museum of Estonian Architecture, 1999, *Eesti puitarhitektuur = Estonian wooden architecture*, Tallinn: Eest Arhitektuurimuuseum		
ICOMOS	Germany		Guljajew Valeri F., 1985, *Zeit und Raum - Zur Gestaltung eines Denkmals der Holzbaukunst*. Berlin: Veb Verlag für Bauwesen	Guljajew Valeri F., 1985, *Zeit und Raum - Zur Gestaltung eines Denkmals der Holzbaukunst*. Berlin: Veb Verlag für Bauwesen
ICOMOS	Germany	Engel H., Bruin H., Schulte Ch., Seiferth R., Bawol Th., 1987, *Das Blockhaus von Nikolskoe: Geschichte- Zerstörung – Wiederaufbau,* Berlin: Senator für Bau- und Wohnungswesen		
GETTY	Germany			Various Authors, 1978, *Wood protection: technical conference sponsored by DEGESCH in Baden-Helental*
-	Hungary	Balogh H., 1940, *Les édifices de bois dans l'architecture religieuse hongroise*, Budapest		
ICOMOS	Lithuania	Jankevicienciene Alge Dr. Kaunas, 2000, *Wooden sacred architecture in Lithuania: churches, chapels and belfries,* Vytantas Magnus University		
ICOMOS	Poland			Brykowski R., 1986, *Podzwonne dla niektórych drewnianych cerkwi. The Knell for some wooden Uniate churches.* Warsaw: Ministerstwo Kultury i Sztuki
ICOMOS	Poland	Kornecki M., 1999, *Wooden churches in little Poland,* in Pamiatky Muzea: Cultural Heritage Magazine 3-99, Bratislava: Ministry of Culture SR		
ICOMOS	Poland			Kornecki M., 1979, *Spalony kosciol drewniany na Woli justowskiej w Krakowie. Problemy konserwatorskie.. Wooden church burnt at Wola Justowska, Krakow conservation problems,* Warsow: Ministry of Culture and Art

ICOMOS	Poland	Regional Centre of Studies on and Protection of the Cultural Environment in Cracow, Warsaw, Commissioner for Historical Monuments, 2000, *Nomination form: Wooden Churches of Southern Little Poland - A Group of Unique Wooden Churches of the 15th to 18th centuries in their Cultural Landscape.*	Regional Centre of Studies on and Protection of the Cultural Environment in Cracow, Warsaw, Commissioner for Historical Monuments, 2000, *Nomination form: Wooden Churches of Southern Little Poland - A Group of Unique Wooden Churches of the 15th to 18th centuries in their Cultural Landscape.*	Regional Centre of Studies on and Protection of the Cultural Environment in Cracow, Warsaw, Commissioner for Historical Monuments, 2000, *Nomination form: Wooden Churches of Southern Little Poland – A Group of Unique Wooden Churches of the 15th to 18th centuries in their Cultural Landscape.*
ICOMOS	Poland	Milobedzki J.A. , 2001, *Timber Churches of Southern Little Poland - comparative study - Supplementary Documentation,* Warsaw-Cracow	Milobedzki J.A. , 2001, *Timber Churches of Southern Little Poland - comparative study - Supplementary Documentation,* Warsaw-Cracow	
ICOMOS	Poland	Marcinek R., Myczkowski Z., Siwek A., 2002, *Wooden Churches of Southern Little Poland Management Development and Spatial Plan - supplementary documentation,* Regional Center for Research and Documentation of Historical Monuments. Warsaw - Cracow, Comissioner for Historical Monuments		
ICOMOS	Poland	Commissioner for Historical Monuments, 2000, *Nomination form: Churches of Peace in Jawor and Swidnica, Poland*	Commissioner for Historical Monuments, 2000, *Nomination form: Churches of Peace in Jawor and Swidnica, Poland*	Commissioner for Historical Monuments, 2000, *Nomination form: Churches of Peace in Jawor and Swidnica, Poland*
ICOMOS	Poland	Gerner M., Schaaf U., Trapp T., 1996, *Die Friedenskirche in Schweidnitz. Kosciol Pokoju w Swidnicy.* Swidnica - Fulda, Deutsches Zentrum für handwerk und Denkmalpflege		
ICOMOS	Poland	Various Authors, 1994, *Friedenskirche in Jawor. Kosciol Pokoju w Jaworze. Peace of Church in Jawor.* Muzeum Regionalne w Jaworze, Wroclaw, JAKS		
ICOMOS	Poland	Marcinek R., Myckowski Z., 2004, *Wooden Churches of Southern Little Poland*, Madrid: San Marcos, UNESCO		
GETTY	Poland	Brykowski R., 2002, *Select documentation of wooden sacral architecture in Poland in 1962-2002 at the Institute of Art of the Polish Academy of Sciences*, Warsaw, Wydawnictwo DiG		
GETTY	Poland	Jankowski A., 2001, *The wooden church in Gasawa: an example of unidentified construction in sacral architecture*, (Ochrona zabytków, vol. 54, 1) Warsaw, Wydawnictwo DiG		
GETTY	Poland	Jankowski A., 2001, *Unknown murals in the wooden parish church of St. Nicholas in Gasawa*, (Ochrona zabytków, vol. 54, 1) Warsaw, Wydawnictwo DiG		

GETTY	Poland			Bieda W., Mielec B., 2000, *Frost penetration of the wooden walls of historical buildings and the durability of wooden constructions upon the example of the church in Debno Podhalanskie*, (Ochrona zabytków, vol. 53, 3) Warsaw, Wydawnictwo DiG
GETTY	Poland	Schaaf U., 2000, *The roof frame of the Church of Peace in Swidnica and its restoration*, (Biuletyn informacyjny konserwatorów dziel sztuki, vol. 11, 4), Lódz, Wydawnictwo Konserwatorów Dziel Sztuki	Schaaf U., 2000, *The roof frame of the Church of Peace in Swidnica and its restoration*, (Biuletyn informacyjny konserwatorów dziel sztuki, vol. 11, 4), Lódz, Wydawnictwo Konserwatorów Dziel Sztuki	Schaaf U., 2000, *The roof frame of the Church of Peace in Swidnica and its restoration*, (Biuletyn informacyjny konserwatorów dziel sztuki, vol. 11, 4), Lódz, Wydawnictwo Konserwatorów Dziel Sztuki
GETTY	Poland	Kozlowski R., 2000, *Microclimate in the historic wooden church in Debno Podhalanskie*, (Biuletyn informacyjny konserwatorów dziel sztuki, vol. 11, 4), Lódz, Wydawnictwo Konserwatorów Dziel Sztuki		
GETTY	Poland			Roznerska-Swierczewska E., 1998, *Problem of preservation of ancient wall paintings in a wooden church designated for overhaul*, (Zabytkoznawstwo i konserwatorstwo, vol. 30, 327), Torun, Uniwersytet Mikolaja Kopernika w Toruniu
GETTY	Poland	Kornecki M., 1992, *Wooden church architecture in Poland* (Ochrona zabytków, vol. 45, 1-2), Warsaw, Wydawnictwo DiG		
GETTY	Poland	Chrzanowski T., 1979, *About the wooden church at Wola Justowska in Krakow*, (Ochrona zabytków, vol. 32), Warsaw, Wydawnictwo DiG		
GETTY	Poland	Kuczman K., 1973, *The wooden church at Baczal Dolny*, Sanok, Muzeum Budownictwa Ludowego w Sanoku		
GETTY	Poland			Brykowski R., 1973, *The wooden Greek-catholic church at Ustianowa Gorna*, Sanok, Muzeum Budownictwa Ludowego w Sanoku
GETTY	Poland			Brykowski R., Czajnik M., 1973, *The wooden Greek-catholic church at Hyrowa (comments on conservation problems)* Sanok, Muzeum Budownictwa Ludowego w Sanoku
GETTY	Poland			Brykowski R., 1973, *Some problems connected with conservation of the parish church at Haczow*, (Ochrona zabytków, vol. 26, 3), Warsaw, Wydawnictwo DiG
GETTY	Poland			Kurpik W., 1972, *Problems of conservation and the chronology of polychromy at the church at Haczow*, Sanok, Muzeum Budownictwa Ludowego w Sanoku

GETTY	Poland			Prosnakowa J., Puciata M., 1961, *The conservation work in the parochial church in Boguszyce near Rawa Mazowiecka*, (Ochrona zabytków, 14), Warsaw, Wydawnictwo DiG
ICCROM	Poland	Rozalska E., 2002, *Historic interior of a wooden church of St. Nicholas in Tarnowo Pa'Uckie: considerations concerning history of art and conservation*, In: "Sacred art heritage: investigations, conservation and restoration. 6th triennial meeting for Baltic states restorers, Vilnius, Lithuania, 21-23 November 2002: preprints", Vilnius: Lithuanian Art Museum		Rozalska E., 2002, *Historic interior of a wooden church of St. Nicholas in Tarnowo Pa'Uckie: considerations concerning history of art and conservation*, In: "Sacred art heritage: investigations, conservation and restoration. 6th triennial meeting for Baltic states restorers, Vilnius, Lithuania, 21-23 November 2002: preprints", Vilnius: Lithuanian Art Museum
ICCROM	Poland		Kloda P., 2001, *O tym jak podniesc drewniany kosciól = How to lift a wooden church*, (Biuletyn informacyjny konserwatorow dziel sztuki = Conservator-restorers'bulletin, Vol. 12, N. 4)	
ICCROM	Poland	Kurek J., 2001, *Drewniana architektura cerkiewna: raport z terenu. Cz. I: ziemia przemyska = Wooden orthodox church architecture: a field report. Part I: Przemysl province*, (Biuletyn informacyjny konserwatorów dziel sztuki = Conservator-restorer's bulletin, Vol. 12, N. 2)		
ICCROM	Poland	Hof C., 2000, *Kirchendachkonstruktionen im südlichen Niederschlesien (Polen),* (Erhalten historisch bedeutsamer Bauwerke, Jahrbuch 1997/1998)		
-	Poland	Matuszczak J., 1975, *Koscioly drewniane na Slasku (Wooden churches in Silesia)*, Wroclaw		
-	Poland	Jadwiszczok K., 1967, *Kosciol pokoju w Swidnicy (The Church of Peace in Swidnica),* Warsaw		
-	Poland			Witkowski W., 2005, *Wybrane problemy z zakresu badań i konserwacji drewnianej architektury sakralnej Archidiecezji Łódzkiej [Selected problems in the study and conservation of timber church architecture of the Łódź Archdiocese],* Łódź
-	Poland		Tajchman J., 2005, *Propozycja systematyki i uporządkowania terminologii ciesielskich konstrukcji dachowych występujących na terenie Polski od XIV do XX w. [A proposal for systematizing and ordering carpentry terminology encompassing timber roof structures occurring on Polish territory from the 16th to the 20th centuries]*, Monument, vol. II, edited by Tadeusz Morysiński	

ICOMOS	Romania	Cristache-Panait I., 1981, *Locul monumentelor de cult din lemn ale Judetului Mures în ansamblul arhitecturii populare romnesti, The place of the wooden cult monuments to be found in the Mures country in the framework of the Romanian folk architecture,* Bucuresti, Consiliul Culturii si Educatiei Socialiste		
ICOMOS	Romania		Greceanu E., 1983, *Technique and craftsmanship with the wood architecture of the district of Hunedoara,* Bucuresti: Consiliul Culturii si Educatiei Socialiste	
ICOMOS	Romania	Panoiu A., 1982, *Arhitectura traditionla din zona centrala a Gorjului*, Bucuresti: Muzeul National de Istorie		
ICOMOS	Romania	Cristache-Panait I., 1985, *Un Monument transilvan în Dobrogea,* Bucharest: Academia de Stiinte Sociale si Politice a Republicii Socialiste România		
ICOMOS	Romania	Cristache-Panait I., 1985, *Valentele istorice si artistice ale bisericilor de lemn din judetul Cluj, propuse pe lista monumentelor,* Bucharest: Consiliul Culturii si Educatiei Socialiste		
ICOMOS	Romania	Cristache-Panait I., 1988, *L'Architecture roumaine en bois et l'art européen,* Bucarest : Académie des sciences sociales et politiques de la République Socialiste de Roumanie		
ICOMOS	Romania	Various Authors, 2001, *Romania: schituri, manastiri, biserici*. Bucuresti, Royal Company		
ICOMOS	Romania	Greceanu E., 1969, *Tipologia bisericilor de emn din zona centrala a Transilvaniei*. (Monumente istorice studii si lucrari de restaurare, n. 3, 1969), Romania.		
ICOMOS	Romania	Pop Bratu A., Pop M., 1980, *Techniques des peintures des églises en bois de Maramures*. In: "Colloque sur la conservation et la restauration des peintures murales, Suceava, Roumanie, 1977". Bucuresti, Conseil de la Culture et de l'Education Socialiste		
ICOMOS	Romania	Imola K., 2005, *Practice of historic roof structure conservation. Case studies: Gothic roof structures from Transylvania.* In: "Proceedings of the International Conference: Conservation of historic wooden structures, Florence 22-27 February 2005; Vol. 2". Florence, Collegio degli Ingegneri della Toscana	Imola K., 2005, *Practice of historic roof structure conservation. Case studies: Gothic roof structures from Transylvania.* In: "Proceedings of the International Conference: Conservation of historic wooden structures, Florence 22-27 February 2005; Vol. 2". Florence, Collegio degli Ingegneri della Toscana	Imola K., 2005, *Practice of historic roof structure conservation. Case studies: Gothic roof structures from Transylvania.* In: "Proceedings of the International Conference: Conservation of historic wooden structures, Florence 22-27 February 2005; Vol. 2". Florence, Collegio degli Ingegneri della Toscana

GETTY	Romania	Cristache-Panait I., 1985, *Historic and artistic value of wooden churches of the department of Cluj, on the proposed list of historical monuments*, (Monumente istorice si de arta, vol. 16, 2)		
GETTY	Romania		Greceanu E., 1983, *Techniques and craftsmanship in wood architecture of Hunedoara*, (Revista muzeelor si monumentelor. Monumente istorice si de arta, 1), Bucharest, Consiliul Culturii si Educatiei Socialiste	
-	Romania	Petranu C., 1931, *The wooden churches in the County of Bihor*, Sibiu		
ICOMOS	Russian Federation	Christie H., 1990, *The log-built churches of Karepia seen through Norwegian eyes*, (Icomos Info. 1) Naples, ESI	Christie H., 1990, *The log-built churches of Karepia seen through Norwegian eyes*, (Icomos Info. 1) Naples, ESI	
GETTY	Russian Federation	Sergejeva N.F., Chernjih N.B., Shurgin, I.N., 1984, *Some results of tbe dendrochronological study of the ancient Russia icon and monuments* of wooden architecture. Paris, ICOM		
GETTY	Russian Federation			Borisova N.T., Erko A.R., 1977, *The methods of restoring size in wooden buildings*, (Artistic heritage, vol. 3, 33), Moscow, Izd-vo Iskusstvo
GETTY	Russian Federation			Varfolomeev Y.A., Shapovalova L.G., 1993, *The strength of wood after long-term use in architectural monuments,* (Izvestiia vysshikh uchebnykh zavedenii. Lesnoi zhurnal, 5-6)
GETTY	Russian Federation	Slipchenko N.I., 1983, *The 17-18 cc. Paintings in Transcarpathian wooden churches of the Tisa basin*, (Artistic heritage, vol. 8, 38) Moscow, Izd-vo Iskusstvo		
ICCROM	Russian Federation			McDonald T., 2003, *Perestroika conservation: the effort to save abandoned log churches in Russia*, (APT bulletin, Vol. 34, N. 1)
ICCROM	Russian Federation			KozlovV.A., Krutov V.I., Kisternaya, M.V., Vahrameeva, T.I., 2000, *Wood condition in the church of the Transfiguration at the Kizhi Museum*. In: "Wood structures: a global forum on the treatment, conservation and repair of cultural heritage". West Conshohocken, ASTM
ICCROM	Russian Federation			Vahrameeva T.I., Lubimov I.V., Tsvetkov V.J., 2000, *Monitoring deformations on the Church of the Transfiguration.* In: "Wood structures: a global forum on the treatment, conservation and repair of cultural heritage". West Conshohocken, ASTM

ICCROM	Russian Federation	Kudrjavtseva E. I., Litvintseva A.P., 2000, *The role of natural conservation of wood in preservation of wooden architectural monuments.* In: "Wood structures: a global forum on the treatment, conservation and repair of cultural heritage". West Conshohocken, ASTM		Kudrjavtseva E. I., Litvintseva A.P., 2000, *The role of natural conservation of wood in preservation of wooden architectural monuments.* In: "Wood structures: a global forum on the treatment, conservation and repair of cultural heritage". West Conshohocken, ASTM
ICCROM	Russian Federation	Miltchnik M., 2000, *The Kizhi Pogost architectural complex in old photographs.* In: "Wood structures: a global forum on the treatment, conservation and repair of cultural heritage". West Conshohocken, ASTM		
ICCROM	Russian Federation	Piskunov Y.V., 2000*, Concepts of repair, restoration, and reinforcement of the Church of the Transfiguration.* In: "Wood structures: a global forum on the treatment, conservation and repair of cultural heritage". West Conshohocken, ASTM		Piskunov Y.V., 2000*, Concepts of repair, restoration, and reinforcement of the Church of the Transfiguration.* In: "Wood structures: a global forum on the treatment, conservation and repair of cultural heritage". West Conshohocken, ASTM
ICCROM	Russian Federation	Kudrjavtseva E.I., Petrash E.G., Sokolova G.A., 1995, *The bell tower of St. Nicholas, Kovda*, (*SPAB news*, Vol. 16, N.4)		
ICCROM	Russian Federation			Kudrjavtseva E., Litvintseva A., 1994, *The restoration of wooden monuments: the ecological approach*, (*Europa nostra*, N. 10)
-	Russian Federation	Alpatov M., Brunov N., 1932, *Geschichte der altrussischen Kunst*, Augsburg		
-	Russian Federation	Ainalov D., 1933, *Geschichte der russischen Monumentalkunst zur Zeit des Grossfürstentums Moskau*, Berlin and Leipzig		
-	Russian Federation	Sobolev N.N., 1934, *Russian popular wood carving*, Moscow/Leningrad		
-	Russian Federation	Buxton D.R., 1934, *Russian Medieval Architecture*, Cambridge		
-	Russian Federation	Zabello S., and others, 1942, *Russian wooden architecture*, Moscow		
-	Russian Federation	Petterson L., 1950, *Die kirchliche Holzbaukunst auf der Halbinsel Zaonez'e in Russisch-Karelien*, Helsinki		
-	Russian Federation	Mekhova G.I., Balgin V.I., 1965, Russian wooden architecture, Moscow		
-	Russian Federation	Smirnova V.I., 1971, *Kizhi*, Petrozavodsk		
-	Russian Federation	Orfinsky V., 1972, *Wooden architecture of Karelia*, Leningrad		
-	Russian Federation			Opolovnikov A.V., 1974, *The restoration of monuments of folk architecture*, Moscow
-	Russian Federation	Zaitsev B., Pinchukov P., 1978, *Sun patterns: wooden folk architecture of the Moscow neighbourhood*, Moscow		

-	Russian Federation	Krasovsky M., 1916, *Course in the history of Russian architecture. Part I: Wooden architecture*, Petrograd		
ICOMOS	Slovakia	Gojdic I., 1999, *Sacred wooden architecture in Slovakia* (Pamiatky Muzea: Cultural Heritage Magazine. n .3, 99) Bratislava, Ministry of Culture SR		
ICOMOS	Slovakia	Voloskuk P., 1999, *Wooden church typology, its protection and restoration*, (Pamiatky Muzea: Cultural Heritage Magazine., n 3, 99), Bratislava, Ministry of Culture SR	Voloskuk P., 1999, *Wooden church typology, its protection and restoration*, (Pamiatky Muzea: Cultural Heritage Magazine., n 3, 99), Bratislava, Ministry of Culture SR	Voloskuk P., 1999, *Wooden church typology, its protection and restoration*, (Pamiatky Muzea: Cultural Heritage Magazine., n 3, 99), Bratislava, Ministry of Culture SR
ICOMOS	Slovakia	Markusová K., 1999, *Wooden church in the Museum Garden in Kosice,* (Pamiatky Muzea: Cultural Heritage Magazine. n. 3, 99), Bratislava, Ministry of Culture SR		
ICOMOS	Slovakia	Lieskovská, R. , Kajba, P.,1999, *Articular church at Hronsek*, (Pamiatky Muzea: Cultural Heritage Magazine. n. 3, 99) Bratislava, Ministry of Culture SR		
ICOMOS	Slovakia	Dudás, M., 1999, *St George's wooden church at Trnové*, (Pamiatky Muzea: Cultural Heritage Magazine. n. 3, 99) Bratislava, Ministry of Culture SR		
ICOMOS	Slovakia	Odler, P., 1999, *Wooden belfries in Spis*, (Pamiatky Muzea: Cultural Heritage Magazine. n. 3, 99) Bratislava, Ministry of Culture SR		
ICOMOS	Slovakia	Cebecauerová D., 1999, *Research in wooden log cabin buildings*, (Pamiatky Muzea: Cultural Heritage Magazine. n. 3, 99) Bratislava, Ministry of Culture SR	Cebecauerová D., 1999, *Research in wooden log cabin buildings*, (Pamiatky Muzea: Cultural Heritage Magazine. n. 3, 99) Bratislava, Ministry of Culture SR	
GETTY	Slovakia	Dudas M., 2001, *Wooden churches of Slovakia and their preservation*, (Biuletyn informacyjny konserwatorów dziel sztuki, n. 3), Lodtz, Wydawnictwo Konserwatorów Dziel Sztuki		Dudas M., 2001, *Wooden churches of Slovakia and their preservation*, (Biuletyn informacyjny konserwatorów dziel sztuki, n. 3), Lodtz, Wydawnictwo Konserwatorów Dziel Sztuki
ICCROM	Slovakia	Sopák P., 2004, *Inventarizace památek ve Slezsku v 1. polovine 20. století*, (Zprávy památkové péce, Vol. 64, N. 6)		
ICCROM	Slovakia	Brázdilová M., 1999, *Kostol svätého Michala archanjela v Bodruzali: restaurovanie nástnnych malieb a historického mobiliára v interiéri,* (Pamiatky a muzea = Denkmäler und Museen, N. 3)		
-	Slovakia	Lazistan E., Michalov J., 1971, *Drevené stavby na Slovensku (Wooden buildings in Slovakia)*, Martin		
-	Slovakia	Bozova J., Gutek Sajancy F., 1997, *The wooden churches of the vicinity of Bardejov*, Bardejov		

-	Slovakia	Sopoliga M., 1999, *Monuments and museums, Wooden Tserkvas in the East Slovakia*, Bratislava		
GETTY	Ukraine			Borisova N.T., Erko A.R., 1977, *The methods of restoring size in wooden buildings*, (Artistic heritage, vol. 3, 33), Moscow, Izd-vo Iskusstvo
ICCROM	Ukraine	Slobodian W., 2001, *Drewniana architektura cerkiewna zachodniej Ukrainy konca XIX i pierwszej polowy XX wieku = Wooden orthodox church architecture in western Ukraine in the late 19th century and early 20th century*, (Biuletyn informacyjny konserwatorów dziel sztuki = Conservator-restorer's bulletin, Vol. 12, N. 2)		
-	Ukraine	Taranushenko S.A., 1976, *Monumental wooden architecture of the left-bank Ukraine*, Kiev		

At the end of this research we can affirm that the existing bibliography on this topic is very large and that the wooden churches are spread all over East Europe. Poland, Romania and the Russian Federation are countries where the documentation has increased over the last few years. The main reason for this great deal of literature in these particular countries is without any doubt the inscription of some of their wooden churches on the World Heritage List.

As to the subdivision of the bibliography into three sectors, corresponding to three different kinds and levels of documentation, we can note that the first sector of the general information is the richest. This is due to the result of the different methods of research used in the data bases of the cited Documentation Centres. In the Getty Conservation Institute, for instance, a short abstract is usually available for every book or document, which is very useful to understand the content of the text. But since very often the information is not technical, it is difficult to classify them in the correct sector. On the contrary, in the UNESCO-ICOMOS Documentation Centre the queries for the research are more complete and it is much easier to obtain satisfactory information very quickly.

In some countries like Lithuania, Estonia, Bulgaria the information found is quite poor because most of the literature existing for these countries is written in their idioms and therefore unsuitable for diffusion.

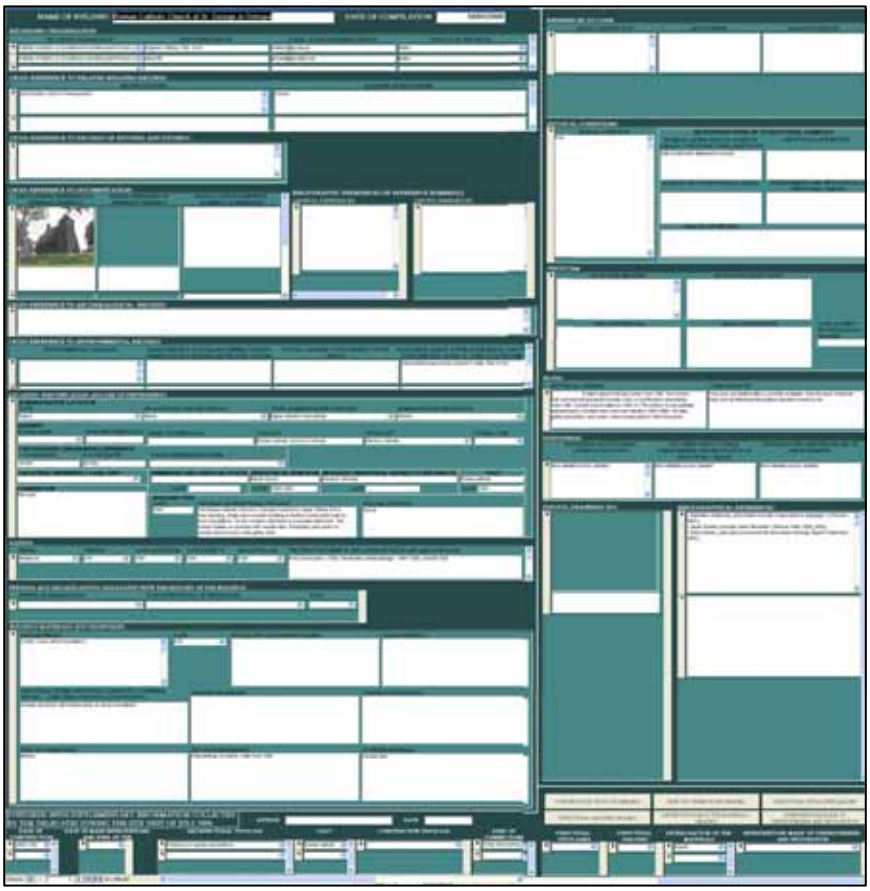
It is very interesting to note that lots of the titles found deal with the topic of the conservation of the wooden monuments, even if most of these titles are very generic. This incredible presence of this kind of technical literature is very important because it demonstrates a deep interest on the preservation of this fragile heritage.

General Database on Wooden Religious Buildings and Churches with Timber Load Bearing Structures

Michela Semplici
Collegio degli Ingegneri della Toscana, Florence

Introdution

Since the beginning, the purpose of this database has been to create a useful and easy instrument that can be opened and used with every kind of personal computer. For this reason we decided to use “access”, a program spread everywhere and very easy to consult. At the same time this database can be easily linked to the official web site of the project and this possibility is very important because it makes it possible to diffuse the knowledge of these churches.



1. Extract of a form of the database for the insertion of new information (exclusive use of the administrator)

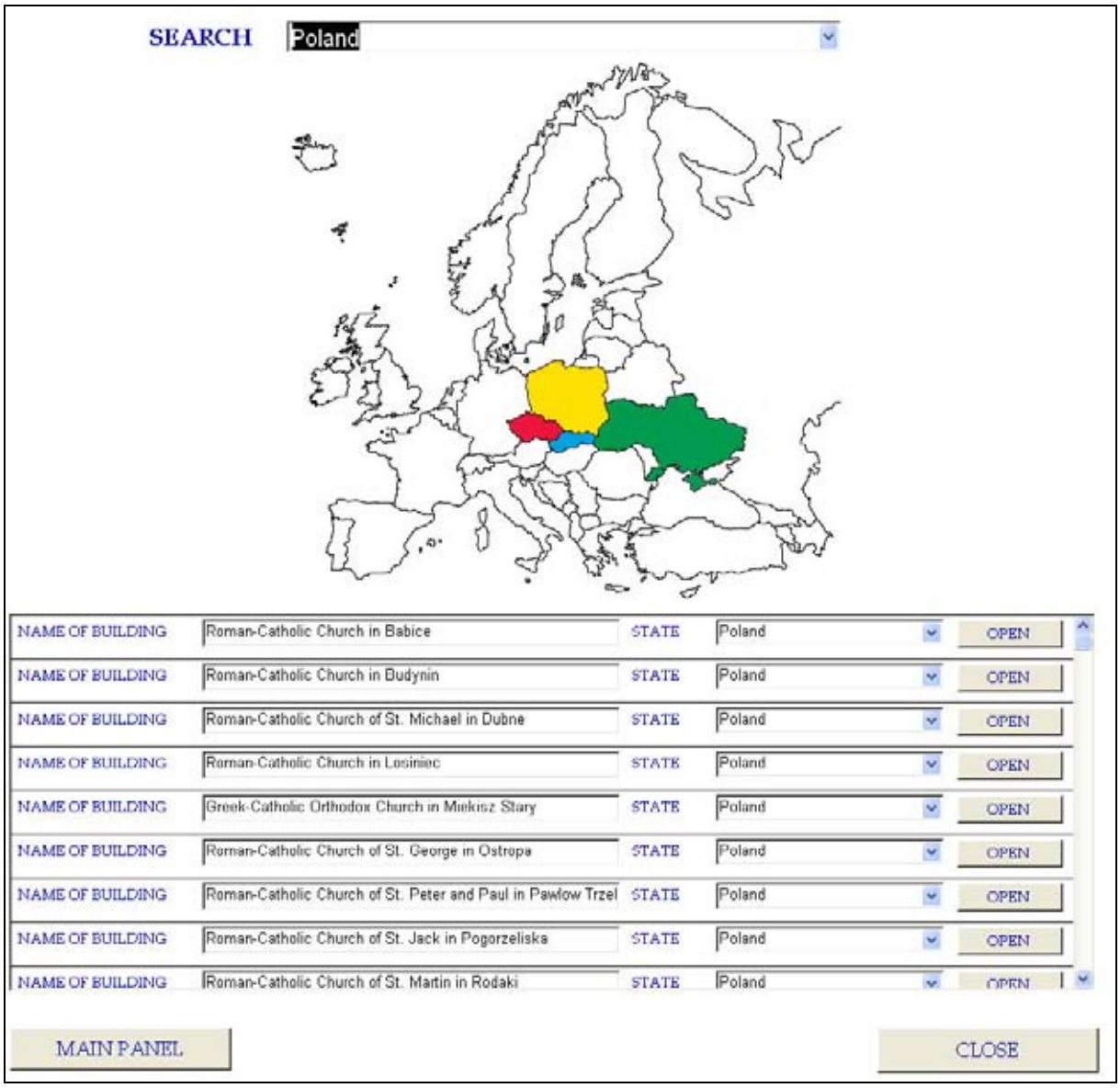
The role of the administrator

The administrator is the person who is in charge to add new information to the database, correct mistakes and load up new forms filled in by users but only after the scientific approval by a responsible.
The form is made according to the scheme studied and approved by the delegates during the meetings of the project (see fig.1).

Different kinds of research

The database created with this very easy system allows different kinds of research and it has lots of potentialities as well.

The first kind of research is the geographical one, after choosing the country that we are interested in, we can see the complete list of the wooden churches of this country present on the database (see fig.2). After it is possible to click and open the form with technical information about each monument.



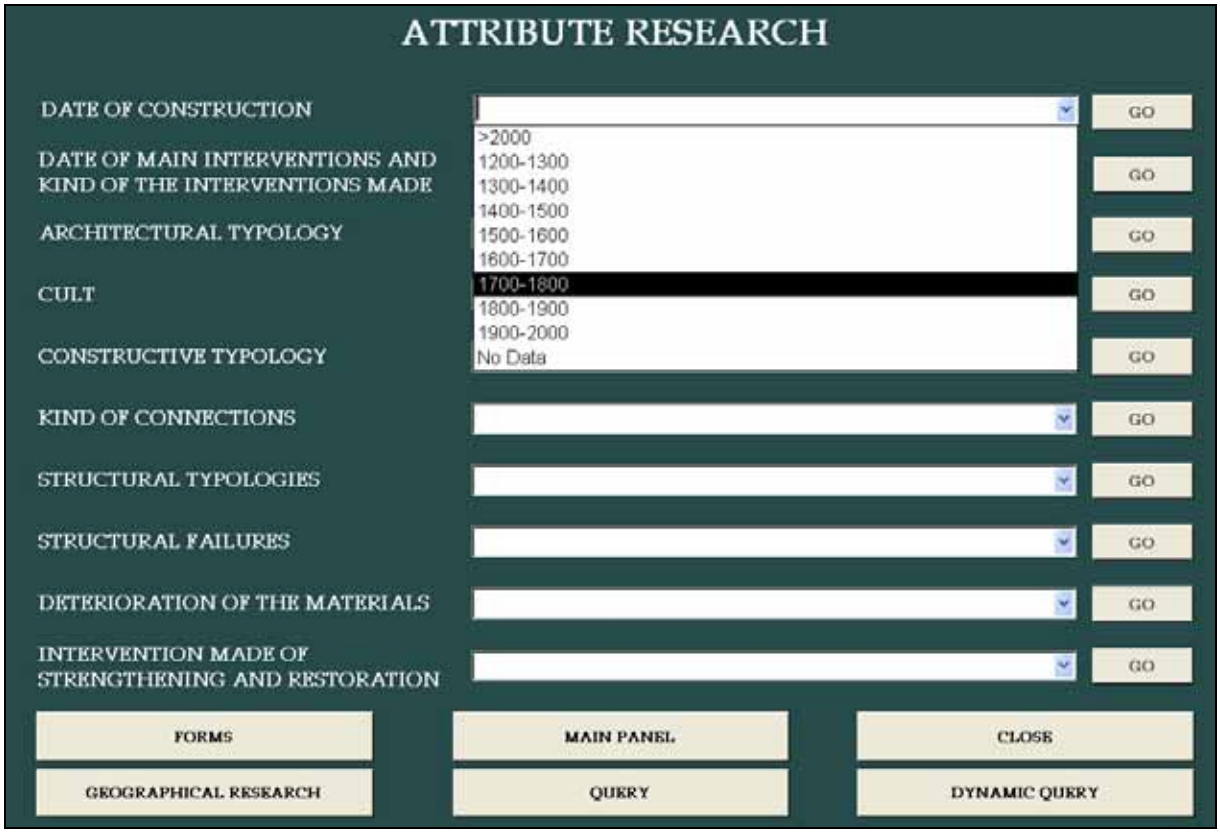
2. Extract of the page of the geographical research

From the page of the “attribute research” (see fig.3) it is possible to start two types of investigation.

The first one concerns the research from: date of construction, date of main interventions, architectural typology, cult and constructive typologies. For every item that we are interested in, we can choose between different dates ranges and options (see fig.4).

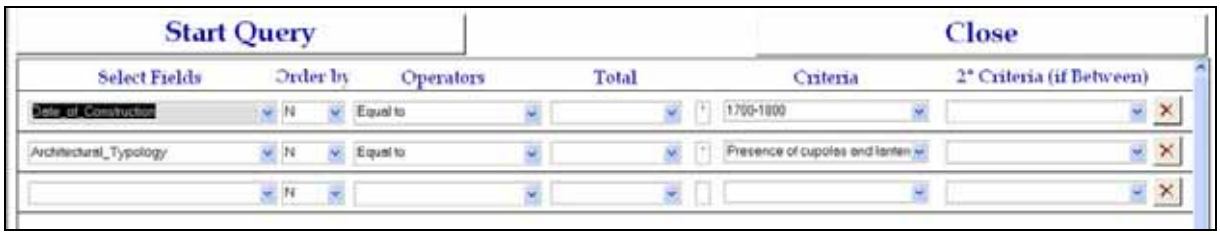
The second one, through the visualization of pictures, makes a direct comparison between different details, possible. These details are: kinds of connection, structural typologies, structural failures, deterioration of the materials and intervention made of strengthening and restoration.

After that, it is possible to click on the box next to the name of the church corresponding to the picture that we are interested in and open the form with the technical information about it.



3. Extract of the page of the attribute research

4. Extract of the page about the search for the date of construction



5. Extract of the page about the dynamic queries

The most interesting kind of research in this database is the “dynamic query” where we can combine more information in order to search the building we are interested in.
After that, it is possible to click on the box next to the name of the church resulting from the combination chosen, and open the form with the technical information about it.

ITALY

Collegio degli Ingegneri della Toscana, Florence

CURRICULUM VITAE

Gennaro Tampone

Graduated in Civil Engineering (1961, University of Bari) and in Architecture (1969, University of Florence).
Member of ICOMOS, Member and Secretary General of Wood International Committee (ICOMOS), Member of ISCARSAH (Committee for Historic Structures, ICOMOS), of UNI (Ente Nazionale Unificazione).
Full academician of the Accademia delle Arti del Disegno, Florence.
President of Collegio degli Ingegneri della Toscana.
Lecturer in the University of Florence on Architectural Conservation.
Leads researches on Ancient Building Techniques, Methodology for Strengthening the Structures of Monumental Buildings, besides on Pre-historic Architecture, Conservation of Timber Structures.
Published 140 papers and a few books. Got three invention patents.

Michela Semplici

Born 1974, graduated at Florence University, Italy, in Architectural Conservation with a dissertation on "Il patrimonio mondiale di strutture e architetture di legno" , she is member of the ICOMOS International Wood Committee.
She is co-operating with Professor Gennaro Tampone in the coordination of the Exhibition on "Strutture architettoniche lignee nella World Heritage List e altre…" for the "Third International Exhibition on Monuments Restoration: from Restoration to Preservation" that the Italian Committee ICOMOS is presenting for the ICOMOS celebrations in 2007.
Besides she is co-operating in the activity of the Secretariat of ICOMOS International Wood Committee hosted at the Collegio degli Ingegneri della Toscana in Florence and she is investigating on "The Timber Architectures and Structures in the UNESCO World Heritage List of Monuments and Sites" for the Dipartimento di Restauro e Conservazione dei Beni Architettonici, University of Florence.
With Professor Gennaro Tampone and the Collegio degli Ingegneri della Toscana she co-operated to the scientific direction of the European project: "Rescuing the Hidden European Wooden Churches Heritage", funded by the Program of the European Union: Culture 2000, and in other international and national activities organized by the same Collegio. She worked on the architectural conservation of religious monuments from 1998 to 2002 in occasion of the "Jubilee Year", during a practical training at the Studio Tecnico Arch. Antonella Morali in San Giovanni Valdarno, Arezzo (Italy).
Published four papers.

Antonello Usai

Born 1971, qualified as a Surveyor at the Istituto per Geometri of Sassari, Italy, is a student of Architecture at Florence University. He is specialised with a pofessional qualification of "Rilevatore fotogrammetrico e restitutore Cad" acknowledged by the Regione Toscana.
Since 2004 he has been working with Professor Gennaro Tampone as a secretary of the Collegio degli Ingegneri della Toscana in Florence where the Secretariat of the ICOMOS International Wood Committee is hosted.
With Professor Tampone he also worked as a co-operator in the European project: "Rescuing the Hidden European Wooden Church Heritage", funded by the Program of the European Union: Culture 2000, and in other international and national activities organized by the same Collegio.
From 1996 to 2002 he worked for the Studio Tecnico Leopoldo Carra in Parma (Italy) and for the SVALTEC srl specialising in architectural surveys, cartography, data banks and topography applied to the territory.

Pier Paolo Derinaldis

Born 1974, graduated at the Florence University, Italy, in Architectural Conservation. He is specializing in Structural Analysis for the Structures of the Monumental Buildings. As Expert of Ancient Timber Structures, he made (2005) for the European Community the survey of the structural system of the ancient wooden Cathedral of Paramaribo, Suriname, South America, and, in co-operation with Professor Gennaro Tampone, the design of the Strengthening Works for the same Cathedral. Published three papers.

OTHER CONTRIBUTIONS

UNESCO-ICOMOS Documentation Centre: an International Bibliographic Resource on Built Heritage

José García Vicente
UNESCO-ICOMOS Documentation Centre

The 2nd Congress of Architects and Specialists of Historic Buildings, held in Venice in May 1964, adopted 13 resolutions, the first one being the International Restoration Charter, better known as **Venice Charter**, and the second one, put forward by UNESCO, provided for the creation of the **International Council on Monuments and Sites** (ICOMOS).

ICOMOS, the International Council on Monuments and Sites, is an association of professionals throughout the world that currently bring together over 8.000 members.

ICOMOS works for the conservation and protection of cultural heritage places. It is the only global non-government organisation of this kind, which is dedicated to promoting the application of theory, methodology, and scientific techniques to the conservation of the architectural and archaeological heritage. Its work is based on the principles enshrined in the 1964 International Charter on the Conservation and Restoration of Monuments and Sites (the Venice Charter).

ICOMOS is a network of experts that benefits from the interdisciplinary exchange of its members, among which are architects, historians, archaeologists, art historians, geographers, anthropologists, engineers and town planners.

The members of ICOMOS contribute to improving the preservation of heritage, the standards and the techniques for each type of cultural heritage property: buildings, historic cities, cultural landscapes and archaeological sites.

ICOMOS is named in the 1972 UNESCO *Convention concerning the Protection of the World Cultural and Natural Heritage* (the World Heritage Convention) as one of the three advisory bodies, with IUCN and ICCROM, to the World Heritage Committee. It is the professional and scientific advisor to the Committee on all aspects of the cultural heritage.

As such, ICOMOS is responsible for the evaluation of all nominations made to the World Heritage List by States Parties to the Convention against the criteria of outstanding universal value, authenticity, management, and conservation laid down by the World Heritage Committee. This involves consultation of the wide range of expertise represented by its membership and its National and International Committees, as well as the many other specialist networks with which it is linked. Expert missions are also sent to carry out on-site evaluations. This extensive consultation results in the preparation of detailed recommendations that are submitted to the World Heritage Committee at its annual meetings.

A brief history of the UNESCO-ICOMOS Documentation Centre

The Documentation Centre was created in 1965 when the statutes of the organization provided for the establishment of an International Documentation Centre on the conservation and restoration of architectural heritage. This was done at the initiative of UNESCO.

In 1966 the Brussels Symposium was held with the purpose of defining the aims, structure, and objectives of the ICOMOS Documentation Centre, which are also described in the Statutes: "*to gather, study and disseminate information concerning principles, techniques and policies for the conservation, protection, rehabilitation and enhancement of monuments, groups of buildings and sites*". (Art. 5b)

The centre was inaugurated in 1974 and became operational in 1977, when ICOMOS hired a documentalist and an assistant to organise and manage it. In 1982 the centre is computerised and a bibliographical database devoted to cultural heritage -ICOMMOS - is created. The documentation centre was part of the *UNESCO-ICOM-ICOMOS network*, it was linked to the central computer at UNESCO by a special line where all the bibliographical information accessible from the computer terminals placed in the different centres was

stored. However, in 1998 UNESCO changed its computer systems, and so the bibliographical database had to be transferred from their mainframe system to ICOMOS's own micro system.

Since June 2002 the database can be searched on the internet at http://databases.unesco.org/icomos. The search interface was produced by WWWISIS, an authoring software for visually producing web forms to query CDS-ISIS.

The Database is also available on the *Conservation Information Network (CIN)* web site (http://www.bcin.ca), of which ICOMOS is a partner.

In 2003 we have started the digitalizing of the ICOMOS old publications and made them available on the web in PDF format (for the moment, there are more than 1.100 articles available).

The Collections

The UNESCO-ICOMOS Documentation Centre specializes in the built heritage, the conservation and restoration of historic monuments and sites with:

- more than 30.000 titles concerning most countries and regions in the world;
- 500 periodicals (150 received regularly by exchange);
- 33.000 slides, photographs, and plans;
- The original nomination files of all the monuments and sites inscribed on the UNESCO World Heritage List.

The specialised bibliographical collections include:
archaeology; conservation and restoration techniques; cultural landscapes; cultural routes; cultural tourism; earthen architecture; historic gardens and parks; historic towns and villages; industrial heritage; intangible heritage; inventories; legislation; monuments in seismic areas; photogrammetry; risk preparedness and heritage at risk; rock art; stone and other building materials; town planning; training; underwater heritage; vernacular architecture; wooden architecture; world heritage monuments and sites.

The original archives of the World Heritage monuments and sites

The UNESCO-ICOMOS Documentation Centre is the primary repository for the original documentation of the cultural properties and mixed (natural and cultural) properties that have been inscribed on the World Heritage List since 1978.

Once a cultural property has been included on the World Heritage List, the UNESCO-ICOMOS Documentation Centre keeps the nomination files and makes them available for consultation. All these nomination files and the associated documentation, which is in many cases very comprehensive, constitute by themselves **the most important collection of the Centre**.

Each nomination file contains the following items:
Documentation and information provided by the States Parties:

- Description and identification of the property
- Justification for inscription
- Management: legal status, protective measures, site management plan, visitor facilities, etc.
- Factors affecting the site
- Monitoring: key indicators for measuring state of conservation, administrative arrangements for monitoring property
- Documentation:
  - photographs, slides and, where available, film/video/CD-ROM;
  - copies of site management plans, legislation, and other legal instruments;
  - cartographic material, measured drawings, etc;
  - bibliography.

And the ICOMOS evaluation reports (The ICOMOS expert's reports are not available)
At the present time, the UNESCO-ICOMOS Documentation Centre keeps the files on 668 cultural and mixed sites inscribed on the World Heritage List, and every year this collection grows with the dossiers of the newly inscribed sites (around 20–30).

ICOMOS Bibliographic Database (http://databases.unesco.org/icomos)

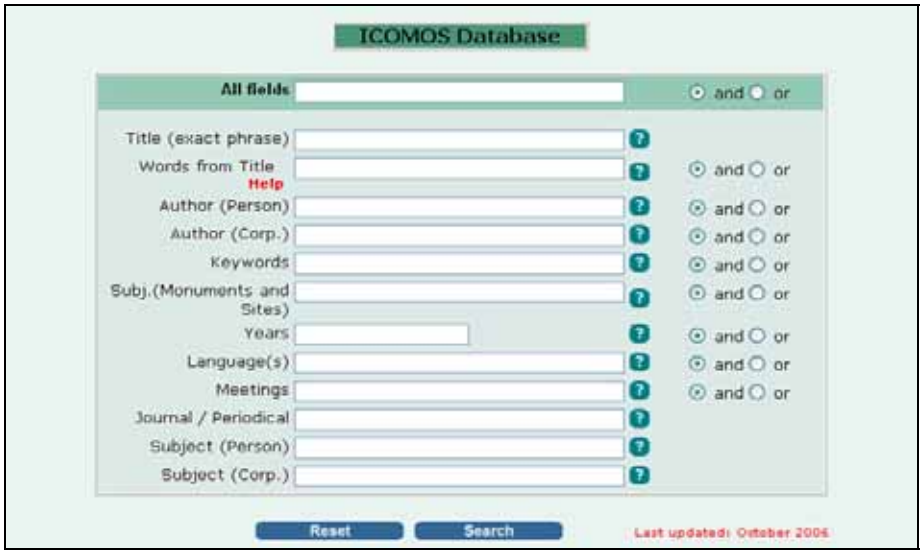
The UNESCO-ICOMOS Documentation Centre was formerly part of the UNESCO-ICOM-ICOMOS Network. In 1997 UNESCO changed its computer system and the two bibliographical databases of ICOM and ICOMOS, which had been merged on UNESCO's mainframe computer in the ICOMMOS database, have since been split into two databases, one for each documentation centre. The transfer of the bibliographical database from UNESCO's mainframe system to ICOMOS's own micro system was completed in June 1999.

The database contains:

- 30.200 bibliographical references;

- A very rich collection on built heritage, its conservation, and preservation; technical reports, proceedings of conferences, mission reports, etc
- Articles from the most important magazines and periodicals available at the Documentation Centre;
- The original nomination files of the World Heritage List.

ICOMOS Bibliographical Database on the web:
Since June 2002 the Database can be searched on the internet at the following address:
http://databases.unesco.org/icomos
All the ICOMOS bibliographic records are also available on the **Conservation Information Network (CIN)** web site (http://www.bcin.ca) of which ICOMOS is a partner.



Search interface of the ICOMOS Bibliographic Database (http://databases.unesco.org/icomos)

Documentation Centre services

The Documentation Centre offers the following services and facilities:
- a reading room
- bibliographical searches
- search of the ICOMOS bibliographic database
- photocopying service: Visitors can photocopy articles from journals and chapters from books, subject to the limits of copyright legislation
- e-mail reference service and document delivery
- sale of ICOMOS publications
- dossiers, specialised bibliographies, *bulletin de sommaires*, etc
- online search of the BCIN database
- The documentation centre is open: Monday: 14h00 - 20h00;
  Tuesday-Friday: 14h00 - 17h00

BCIN: Bibliographic database of the *Conservation Information Network* (http://www.bcin.ca)

The *Conservation Information Network* (CIN) is the product of international collaboration. It is intended to facilitate the retrieval and exchange of information concerning conservation and restoration of cultural property.

The Bibliographic Database of the Conservation Information Network (BCIN) provides access to over 200.000 bibliographic citations for conservation literature. BCIN includes citations from the Art and Archaeology Technical Abstracts (prior to 1998), technical reports, conference proceedings, journal articles, books and audiovisual and unpublished materials. The database also includes previously unavailable material from private sources, as well as new information gathered by a worldwide network of contributors.

BCIN was first initiated by the Getty Conservation Institute and ICCROM. It was launched in 1987 as a subscription database, available through the Canadian Heritage Information Network (CHIN). In May 2002, BCIN was made available free of charge on the CIN Web site, hosted by CHIN. The database interface, re-designed in 2002, includes both a simple and advanced search, and the ability to refine searches, among other features.
The partners of the BCIN are: Canadian Conservation Institute, Canadian Heritage Information Network, Getty Conservation Institute, ICCROM, Instituut Collectie Nederland, ICOM, ICOMOS, Library and Archives Canada and Smithsonian Museum Conservation Institute

In 1986 ICOMOS became a partner in CIN and since then, the UNESCO-ICOMOS Documentation Centre has been participating in BCIN.
The BCIN database is available at http://www.bcin.ca

Selected Examples of Upper-Silesian Wooden Churches Rescuing from Destructive Elements

Aleksander Niedzielski, Piotr Stachurski
Silesian University of Technology

Upper-Silesian group of wooden churches is one of the greatest in Europe. There are 65 wooden churches, survived until now, in the present Province of Opole (Województwo Opolskie), and 58 in the present Province of Silesia (Województwo Śląskie). For comparison, there are only 15 wooden churches in the present Province of Lower Silesia (Województwo Dolnośląskie). Following westwards, much more popular was timber-frame construction.

The area of present provinces of Silesia and Opole is not identical with the historic Upper Silesia. In the past, the west part of the Province Opole (Nysa, Brzeg) belonged to the Lower Silesia. A large part of the Province of Silesia (Częstochowa, Zawiercie, Myszków in the north and north east; Sosnowiec, Będzin, Czeladź, Dąbrowa Górnicza, Jaworzno in the east; Żywiec and Biała in the south-east) was originally a part of Małopolska. As usual in history, the border of described area was not constant and it was changed many times. The most important change was a result of Austrian-Prussian (Silesian) wars, 1740-42, 1744-45, 1756-63; when almost the whole Silesia was incorporated to the Prussian Kingdom. Only the duchies of Cieszyn and Opava remain under the Austrian rule. Nowadays not only the former Duchy of Cieszyn but also the town of Cieszyn itself is divided by the Polish-Czech border.

Up to the middle of 18th century wood was a building material dominating not only in rural, but also in small towns' architecture. As a result of Industrial Revolution, especially at the end of 19th and the beginning of 20th century, a provincial, country area of East Upper-Silesia became one of the biggest industrial areas in Europe, with new urban development and also with new monumental churches. Small wooden churches became often unnecessary and unwanted relic of country past, alien in new industrial city environment. In many cases the only way to rescue them from total devastation was to move them to the different place. In the present Province of Silesia 12 from 58 survived wooden churches changed their original location in the years 1900-2006, and for this area, for this group of wooden churches this is one of the most serious conservation problems.

The purpose of this document is not to make a comprehensive study of Upper-Silesian wooden church architecture, concerning problems of destruction, rescuing from destruction and restoration, but to define the most important kinds of threatening and possible positive alternatives, and to show them in practice, relying on selected examples of Upper-Silesian wooden churches. Mentioned kinds of threatening were classified according to basic **ELEMENTS OF DESTRUCTION**: FIRE, WATER; MICROORGANISMS (strictly connected with high humidity) and "ARCHITECTS"

1. FIRE.

Flammability is probably the most considerable fault of wood as a building material. For wooden constructions fire is always a reason of severe, in many cases of total destruction.

Wooden church of Blessed Virgin Mary's Birth and St. Martin in ŁĄCZA (20km west of Gliwice) was built before 1447. In this time it was a parish church. Before 1598 Łącza was incorporated to the parish of Bojszów. The original dedication of the church was St. Martin's. In 16th. and 17th. century wooden church in Łącza was

temporarily converted into a Protestant church. In the years 1698-1929 the church was dedicated to St. John the Baptist. In 1992 the church was rescued from the great forest fire. Unfortunately 2 years later, in 1994, it burned down in the result of arson, and was not reconstructed, in spite of compensation payment. It was much more prestigious for the local community to build a new church of reinforced concrete construction. This new church was consecrated in 2000.

2-3. WATER and MICROORGANISMS (strictly connected with high humidity).

The Rosary Chapel in BUKÓW (15km south-east of Racibórz) was built in 1770. It's a small cross-road chapel, on the layout of a square (c.4m side) closed by a half of octagon, with walls of log construction, single-framed roof, and a turret topped by a baroque cupola. The total height of the church, including turret, is c.10m. During the great flood in 1997, called the flood of the millennium, the church was flooded to the height of 2m. In 1999 it was restored according to the project by Aleksander Niedzielski.
A great flood, like that in 1997, is an unusual event. High levels of humidity resulting in increased growth of microorganisms destroying wood are not always related to exceptional disasters.
It's a problem of about 70% of historic wooden structures in described area.

4. "ARCHITECTS"

Activity of different kind of "architects" can be the most unpredictable element of destruction. This problem cannot be reduced exclusively to the activity of occupational architects. Many people use to fancy themselves as the "architects of new reality" (especially trendy among the politicians). To describe such kind of threatening, the following definition can be useful: **"architect"** - somebody whose main purpose is to create a ***new reality***.

Churches in their original location.

The church of St. George in OSTROPA (nowadays a district of Gliwice) is a unique example of applying both brick and wooden construction in one church. The first church in this place was built before 1340. It was burnt during the Hussite Wars (15th century). In a year 1640 a new church was built. It's not out of the question that the new wooden nave and west tower were built on survived medieval brick foundation. At the end of 17th century the brick presbytery was built most probably with using of relics of medieval church. There is a unique complex of wall paintings inside, mainly in the nave but also in the presbytery.
Since 1927 when the new brick parish church of The Holy Spirit was consecrated, the old church of St. George stopped serving as a parish church. Now the church is closed, inaccessible for visitors, opened only during occasionally celebrated Liturgy and rare cultural events. Such abandoned church is exposed to destructing influence of different natural factors (humidity, mining damage, etc.), but the most dangerous in this case, may be activity of thieves and vandals, like for example graffiti painters, who decided to "create" a new painting interior decor.

The wooden church of St. Nicolas in WILCZA GÓRNA (14km south of Gliwice, 13km north of Rybnik) was built in the 1st half of 18th century. It's still a parish church, in original location, surrounded by old deciduous trees. The fence is not original, even not establishing a connection to the original form. It's not perfect but possible to accept. Unfortunately, in the direct environment of the church, is an offending architectural clash - huge concrete electric poles. Such solution is a typical example of architectural thought (or it will be better to say thoughtlessness) of the communist period - "*it's not beautiful, but necessary, it's impossible to do it differently, and at all such notions like human values and cultural heritage are only caprices of crazy intellectuals*".

The church of Corpus Christi in JANKOWICE RYBNICKIE (7km south of Rybnik) is a rare example of a wooden church with transept. It was built a few years before 1675, and soon it became a pilgrimage church. Since 1897 it is also a parish church. There is a conservation problem of different kind. New architectural (and not only architectural) realisations, mainly around the church, were undertaken in order to "beautify" this place. Unfortunately all of them represent aesthetics and architectural logic completely different than the original aesthetics and architectural logic of the church and its surrounding (bright oil painting on a dark wooden wall of the presbytery; lamps imitating form of a 19th century street lamp; new belfry - 3 miniature wooden towers, seemingly referring to original forms of wooden architecture, in fact completely ignoring the original idea of belfry as a bell-tower serving at the same time as a defensive watchtower, or a simple standalone load-bearing construction of a bell).

Churches moved to different places.

The church of St. Lawrence, built in BOGUSZOWICE (nowadays a district of Rybnik) in 1717, is also an atypical wooden church with transept, established on the layout of Greek cross. The west tower was added in 1830. In 1975 the church was moved to LIGOCKA KUŹNIA (also a district of Rybnik). In a year seriously damaged church was restored and its new environment was arranged. As the restoration of the church itself raises no doubts, the surrounding is a result of the same attitude as in the previous example. The purpose is not to fit the surrounding to the architectural logic of a wooden church, but to create something new, something more beautiful in opinion of the creators, but in fact nothing more but trendy in a moment. A result of such attitude is a formal garden with

coniferous trees, mainly such exotic species in Central-European climate like thuja and cypress tree, and pavements of concrete puzzles. The new belfry of simple steel truss construction with a small roof covered with shingle is not optimal but acceptable solution.

The St. Nicolas was one of two wooden churches in PRZYSZOWICE (8km south-east of Gliwice) most probably it was built in 1640. This is an oriented church with a sacristy adjoining to the presbytery from the north, a square chapel adjoining to the presbytery from the south and a south porch adjoining to the nave. The west tower was built in 1720-30. In the years 1936-39 the church was moved to BOROWA WIEŚ (nowadays a district of Mikołów, 8km north-west of the city centre and 14km south-east of Gliwice). However, a parish was erected in Borowa Wieś only in 1957.

The new location was chosen correctly, at the former school field, close the wide-stretching roadside trees. Over the course of time the road from Gliwice to Mikołów became one of the most busy traffic routes in the region. This is connected not only with visual proximity of traffic signs, but also, especially in the recent time of political and economic transformation, of aggressive advertising, of omnipresent advertising banners promoting everything possible - signs of a new "religion" of free market and wild capitalism. It's a little bit similar to architectural ideology of dominating role of the heavy industry - *advertisement is not to be beautiful, advertisement is not to be in accordance with aesthetic and cultural values of the environment, advertisement is to be effective, because business is business*. This is not the only conservation problem of the church. A wooden fence, not original, but appropriate, was unfortunately "beautified" by marble facings.

The church of St. Catherine was built in GIERAŁTOWICE (9km south-east of Gliwice) in 1534. The west tower and the turret over the nave are a little bit later. The interior decor dates from the period of late baroque. Originally the church was located up a little hill, amongst old trees, in the middle of local cemetery. In 1976 it was moved to WIELOPOLE (nowadays a district of Rybnik, 3km north of the city centre).

As in the case of the churches described above, we can say about architectural errors, oftentimes quite serious, the church moved from Gierałtowice to Rybnik-Wielopole is an example of architectural disaster. Wooden church, originally accessible from ground level, was put on a concrete platform, and two sets of reinforced concrete stairs with bent iron balustrades lead up to the main entrance of the church (in the west tower) and to the sacristy. Around the church, a thick coniferous forest was planted. At the moment, it's still a young forest, but in near future the view of the church will be completely obstructed by the trees. A pavement of concrete puzzles forming diamond-shaped patterns is a consequent complement of this anti-aesthetic idea.

The church of Assumption of The Virgin was built in ZĘBOWICE (16km south of Olesno, 35km east of Opole, 64km north of Gliwice) in1447 or 1493. It was almost completely rebuilt in 17th and 18th century. The west tower was added in 1777. In the twenties of the last century the church was transferred to the Central Cemetery (Cmentarz Centralny) in GLIWICE, one of the best planed cemeteries of this time in Europe. Since 1926 the church served as a funeral chapel. Up to the end of the seventies, it was closed for liturgy. Abandoned and unsecured, it became totally devastated. In 1992 it was pulled down. The church was reconstructed in the years 1997-2000 at the Starokozielski Cemetery (Cmentarz Starokozielski), and until now it serves as a rector's church connected with the parish of The Holy Cross, administered by the Redemptorists.

The present location is not as good as the previous (proximity of modern city architecture, admittedly separated by a park landscaping of the cemetery, but visible in the background). However, the new location allowed to restore the church to liturgical function. The main conservation problem of this church is not a new architectural context, but a question of historical authenticity and a definition of architectural monument. The reconstructed church was generally built of new materials, according to the architectural as-built drawings of the church pulled down. This is not only a problem of this church, even not only a problem of wooden churches or wooden architecture in general. This is one of the basic questions in conservation.

At the end a positive example of a wooden church transferred from its original location. The church of St. Michael was moved from SYRYNIA (20km south-west of Rybnik, 15km south-east of Racibórz, 9km west of Wodzisław Śląski) to the Kosciusko Park (Park Kościuszki) in KATOWICE in the years 1938-39. It was built probably in a year 1510, but the oldest mention of a church in Syrynia dates from the year 1305. The standalone bell-tower dates from the 17th century. The church and the bell-tower are surrounded by wooden fence with three entrance gates. The church was to be the first building in an open-air ethnographic museum. The museum was never created, but the church became the oldest architectural monument of Katowice - the centre of the Upper Silesia industrial region, an agglomeration of c.3,5 million inhabitants. It is specially important to notice that the new location of the church, a landscaped garden in the centre of Katowice, is in accordance with the original architectural idea of a wooden church in natural landscape.

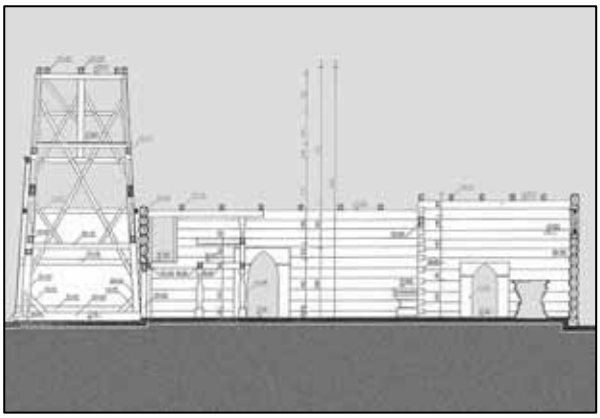
Bibliography:

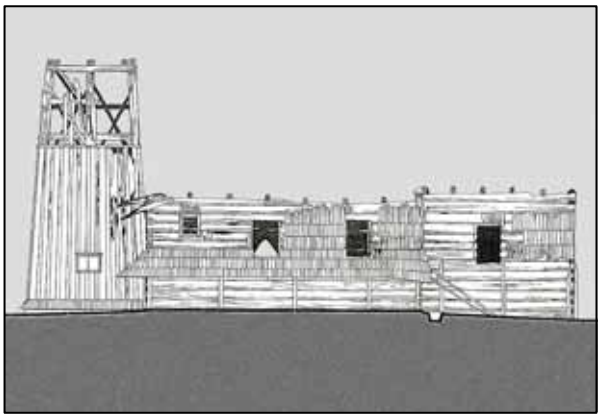
- Brejman, A., Bau-Konstruktionen-Lere, Leipzig 1900;
- Jungnitz, J., Visitatio - Visitations-Berichte Diözese Breslau -1651, Breslau 1908;
- Matuszczak, J., Kościoły drewniane na Śląsku, Ossolineum - Wrocław 1975;
- Mokłowski, K., Sztuka ludowa w Polsce, Lwów 1903.

and also:

Architectural designs of the churches in Buków and Łącza, A. Niedzielski 1997/2000

Architectural surveys of wooden churches, Silesian University of Technology (Gliwice - Poland), Faculty of Architecture, Chair of History and Theory of Architecture

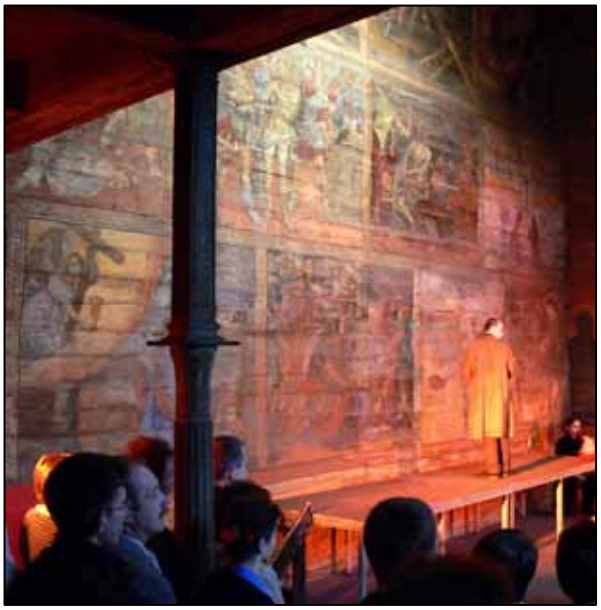




1a. ŁĄCZA - church of Blessed Virgin Mary's Birth and St. Martin - architectural survey made by A. Niedzielski after the fire in 1994 - longitudinal section.
1b. ŁĄCZA - church of Blessed Virgin Mary's Birth and St. Martin - architectural survey made by A. Niedzielski after the fire in 1994 - south elevation

2a. BUKÓW - Rosary Chapel - the water level during the great flood in 1997.
2b. BUKÓW - Rosary Chapel - south elevation.

3a. GLIWICE-OSTROPA - church of St. George - view from south-east.
3b. GLIWICE-OSTROPA - church of St. George - view from north-west.



3c. GLIWICE-OSTROPA - church of St. George - theatre performance in the church interior.
3d. GLIWICE-OSTROPA - church of St. George - theatre performance in the church interior - wall paintings in the background.
3e. GLIWICE-OSTROPA - church of St. George - wall paintings in the nave - Flagellation of Christ.
3f. GLIWICE-OSTROPA - church of St. George - wall paintings in the nave and contemporary graffiti.

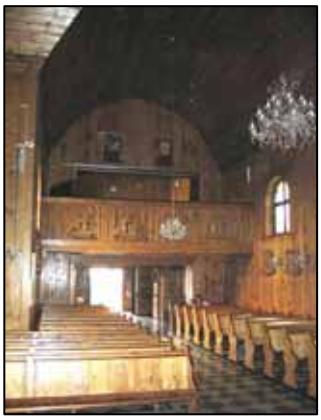
4a. WILCZA GÓRNA - church of St. Nicolas - view from south-east.

4b. WILCZA GÓRNA - church of St. Nicolas - view from south-west.

5a. JANKOWICE RYBNICKIE - church of Corpus Christi - view from north-west.

5b. JANKOWICE RYBNICKIE - church of Corpus Christi - view from east.

5c. JANKOWICE RYBNICKIE - church of Corpus Christi - the new belfry.



6a. RYBNIK- LIGOCKA KUŹNIA (originally BOGUSZOWICE) - church of St. Lawrence - the interior, view towards east.

6b. RYBNIK- LIGOCKA KUŹNIA (originally BOGUSZOWICE) - church of St. Lawrence - the interior, view towards west.

6c. RYBNIK- LIGOCKA KUŹNIA (originally BOGUSZOWICE) - church of St. Lawrence - view from south-east, formal garden in the foreground.

6d. RYBNIK- LIGOCKA KUŹNIA (originally BOGUSZOWICE) - church of St. Lawrence - the new belfry.

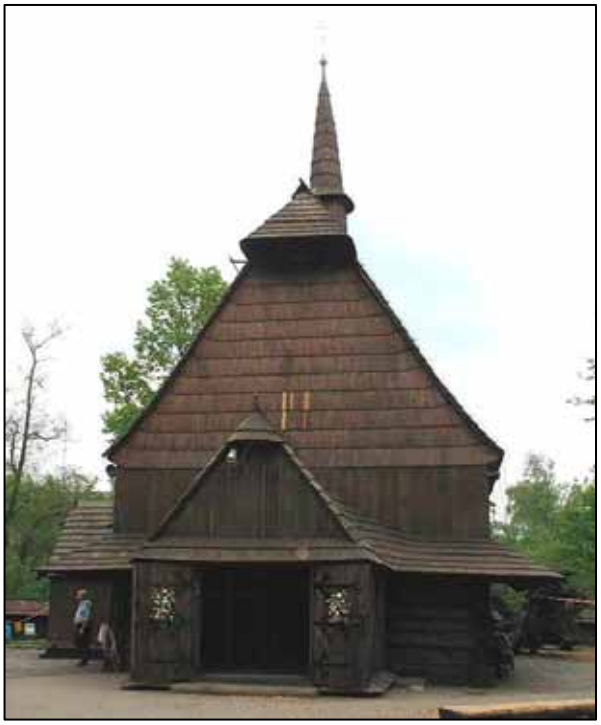

7a. MIKOŁÓW- BOROWA WIEŚ (originally PRZYSZOWICE) - church of St. Nicolas.
7b. MIKOŁÓW- BOROWA WIEŚ (originally PRZYSZOWICE) church of St. Nicolas - advertising banner in the foreground.

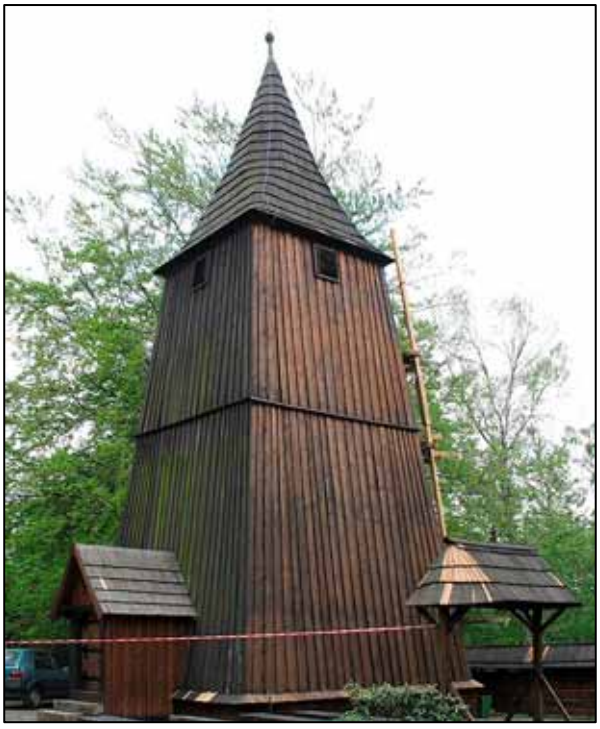


8a. RYBNIK-WIELOPOLE (originally GIERAŁTOWICE) - church of St. Catherine - view from south-east.
8b. RYBNIK-WIELOPOLE (originally GIERAŁTOWICE) - church of St. Catherine - view from north-east.
8c. RYBNIK-WIELOPOLE (originally GIERAŁTOWICE) - church of St. Catherine - reinforced concrete stair with bent iron balustrade.


9a. GLIWICE (originally ZĘBOWICE) - church of Assumption of The Virgin - view from north.
9b. GLIWICE (originally ZĘBOWICE) - church of Assumption of The Virgin - view from south-west.

9c. GLIWICE (originally ZĘBOWICE) - church of Assumption of The Virgin - view from north-west.
9d. GLIWICE (originally ZĘBOWICE) - church of Assumption of The Virgin - cupolas of the west tower and the turret.





10a. KATOWICE (originally SYRYNIA) - church of St. Michael - view from south-west.
10b. KATOWICE (originally SYRYNIA) - church of St. Michael - view from west.
10c. KATOWICE (originally SYRYNIA) - church of St. Michael - the standalone bell-tower.
10d. KATOWICE (originally SYRYNIA) - church of St. Michael - entrance gate.

Web site: www.european-wooden.religious-heritage.org

Events

Conference, Exhibition and Workshop
Florence, 20 October 2006, Faculty of Architecture, Plesso di S. Verdiana, Piazza Ghiberti, 27
h. 9.30: presentation-conference of the final results of the project;
h. 15.30: international student's workshop with experts in field

Exhibitions and video-conference
Bratislava, Faculty of Architecture, 24-31 October 2006: exhibition of the projects and final results
Brno, Faculty of Architecture, 24-31 October 2006: exhibition of the projects and final results
Cracow, Faculty of Architecture, 24-31 October 2006: exhibition of the projects and final results
Warsaw, Faculty of Architecture, 24-31 October 2006: exhibition of the projects and final results

Contacts

Fondazione Romualdo Del Bianco – Simone Giometti - info@fondazione-delbianco.org
Collegio degli Ingegneri della Toscana – Gennaro Tampone - att.culturali@collegioingegneri.toscana.it
Faculty of Architecture of Bratislava – Eva Král'ová - eva.kralova@stuba.sk
Faculty of Architecture of Brno – Helena Zemánková - Zemankova@ucit.fa.vutbr.cz
Faculty of Architecture of Cracow – Andrzej Kadłuczka - a-1@institute.pk.edu.pl
Faculty of Architecture of Warsaw – Stefan Wrona - wrona@arch.pw.edu.pl
Kharkov State Technical University of Construction and Architecture – Tetyana Sergeyeva - tvs@kstuca.kharkov.ua

The Romualdo Del Bianco Foundation is a non-profit Florentine institution promoting initiatives which encourage mutual exchanges of knowledge among students and professionals from different countries with an extensive network of universities, libraries, museums, embassies, consulates, as well as public and private cultural institutions and organizations worldwide (http://www.fondazione-delbianco.org). The Foundation endorses an arrayof cultural events in order to augment the distribution of research information among participants in any specific field of study. Yearly an average of more than 700 persons (942 in 2006) take part in the programs of International Integration of the Romualdo Del Bianco Foundation, and more than a half of them are young students of Central & Eastern European, Asian and American Universities. The Foundation relies upon 144 American, European and Asian academicians/experts grouped in different national committees, who follow constantly the evolution of the activity of the Foundation, giving suggestions, thinking and proposing new initiatives, creating new occasions for mutual visibility and spreading the knowledge of the activity of the Foundation. 138 formal agreements of mutual co-operation have been up to now signed by the Foundation and the representatives of European and Asian Universities, for the joint development of mutual co-operation and realisation of social and cultural initiatives

The Tuscan College of Engineers
(Collegio degli Ingegneri della Toscana), founded in 1876, is a non-profit cultural Association created for the purpose of disseminating technical-scientific knowledge in the field of engineering and architecture. These aims are achieved by means of conferences, debates, seminars, courses and other pertinent activities.
It publishes the "bollettino ingegneri", a monthly magazine on engineering and architecture which was founded in 1953 and which publishes original scientific and technical articles, the reference price list for building activities and a guide of building categories and codes. The Association acts through the subsidiary company Alter Ego Ing Arch S.r.l.